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CANADIAN GEOGRAPHICAL JOURNAL

THE CANADIAN GEOGRAPHICAL SOCIETY

OTTAWA, CANADA

The Society's ambition is to make itself a real force in advancing geographical knowledge, and in disseminating information on the geography, resources and people of Canada. In short, its aim is to make Canada better known to Canadians and to the rest of the world.

As one of its major activities in carrying out its purpose, the Society publishes a monthly magazine, the Canadian Geographical Journal, which is devoted to every phase of geography — historical, physical and economic — of Canada, of the British Commonwealth and of the other parts of the world. It is the intention to publish articles in this magazine that will be popular in character, easily read, well illustrated, and informative.

The Canadian Geographical Journal will be sent to each member of the Society in good standing. Membership in the Society is open to any one interested in geographical matters. The annual fee for membership is four dollars (Canadian currency).

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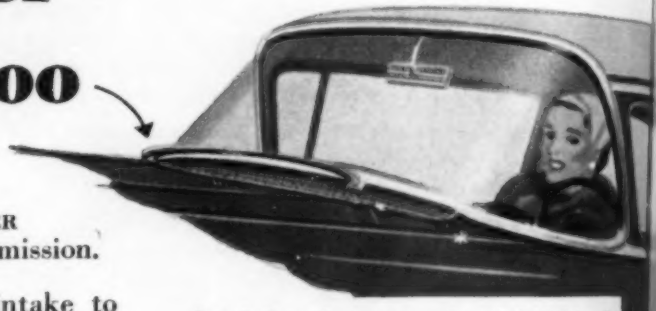

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CANADIAN GEOGRAPHICAL JOURNAL

Published monthly by
THE CANADIAN GEOGRAPHICAL SOCIETY
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Editor - GORDON M. DALLYN — Assistant Editor - MALVINA BOLUS

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APRIL, 1954 ✦ VOLUME XLVIII ✦ NUMBER 4

COVER SUBJECT:—*Pyramid Mountain from Lac Beauvert, Jasper National Park, Alberta.*
Colour photograph by G. M. Dallyn.

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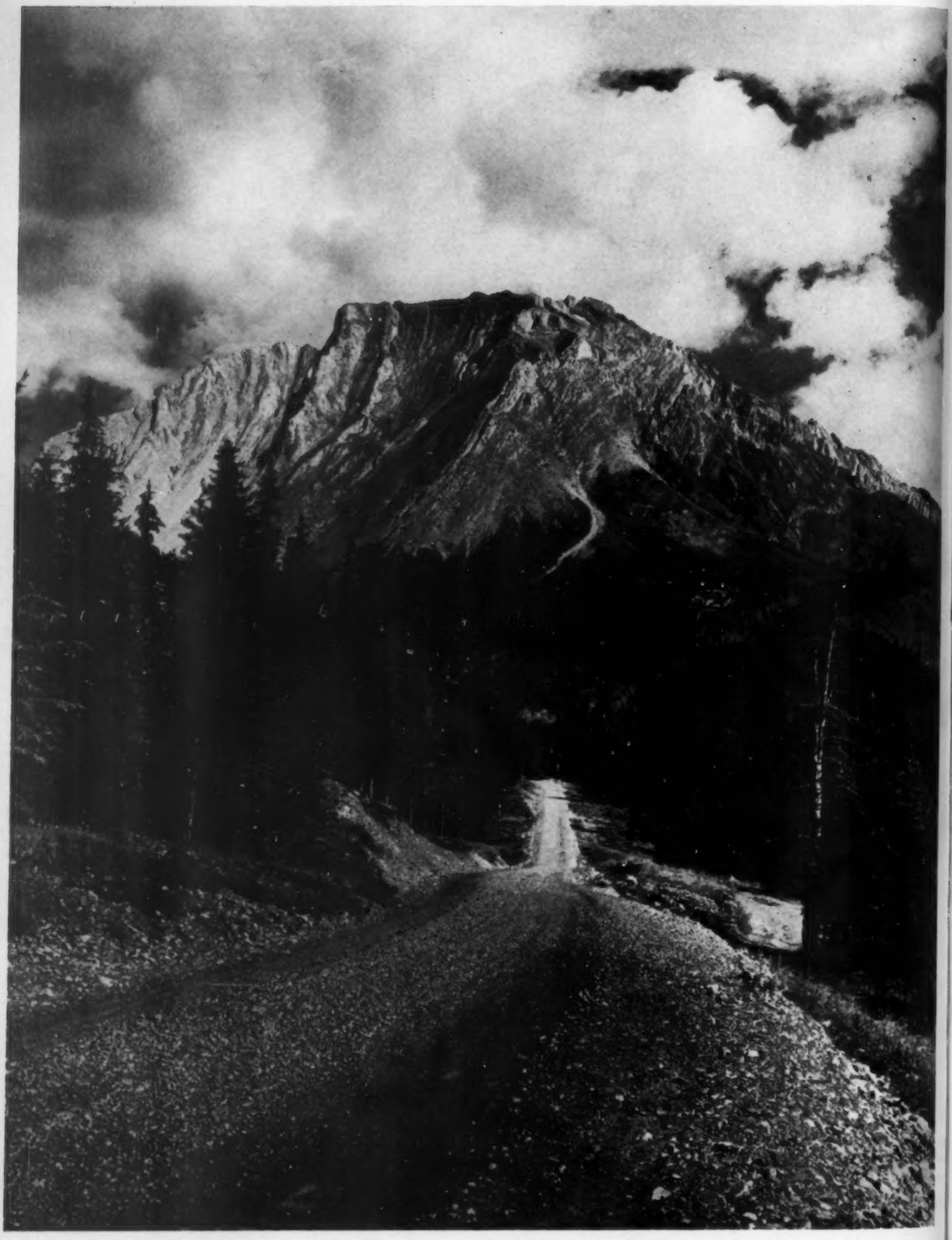


A high stretch of the Coleman Kananaskis road, near Mile 91. It is late summer before all snow melts from the mountain tops.

Alberta Government photograph

Falls of crystal clear water on the Livingstone River. There is a campsite on the bank nearby.

Eastern Rockies Forest Conservation Project

by LYN HARRINGTON *photographs by* RICHARD HARRINGTON

except where otherwise credited.

MOTORISTS have exulted for two summers over the new road through the Rocky Mountains, which leads from Coleman to the Bow River. One hundred and forty miles of highly scenic country, it offers a short cut to Banff and Jasper National Parks from the Crowsnest Pass.

Despite the large sign which greets travellers just north of Coleman, and the fact that each driver must fill out a travel permit, few realize the significance of the project through which they are passing. In this Forest Reserve, the extremely modest Eastern Rockies Forest Conservation Board is pioneering in a phase of

Daisy and Racehorse Creeks meet and race together, to flow eventually into the Saskatchewan River. Most of the summer flow is from the melting glaciers.

federal-provincial co-operation, "the biggest conservation project of its kind in Canada, if not in the whole world," to quote Major-General Howard Kennedy, Chairman of the Board.

The ultimate aim is nothing less than to keep the Saskatchewan River flowing.

The Reserve is actually three provincial forests—Crowsnest, Bow River and Clearwater —8,619 square miles in extent, almost the combined size of Jasper and Banff National Parks. The Reserve interlocks with the boundaries of these national parks, the British Columbia border, and Waterton Lakes National Park, with corridors at Crowsnest Pass and the Banff-Calgary Highway. The area is very irregular in outline, varying from six to seventy-five miles in width, and having a depth of 300 miles.

The short-grass plains of the south and east fold into wooded coulees, change quickly into rolling foothills, and rise to forested slopes and snow-crowned crags. Vegetation changes with the altitude, from bunch-grass slopes,

Snow lies in crevices of the Highwood Range until July and runs in clear streams over the gravel. This high country about Mile 90.5 is alive with whistling marmots.

poplar and willows stands, to Lyall's larch at timberline, and alpine meadows above that.

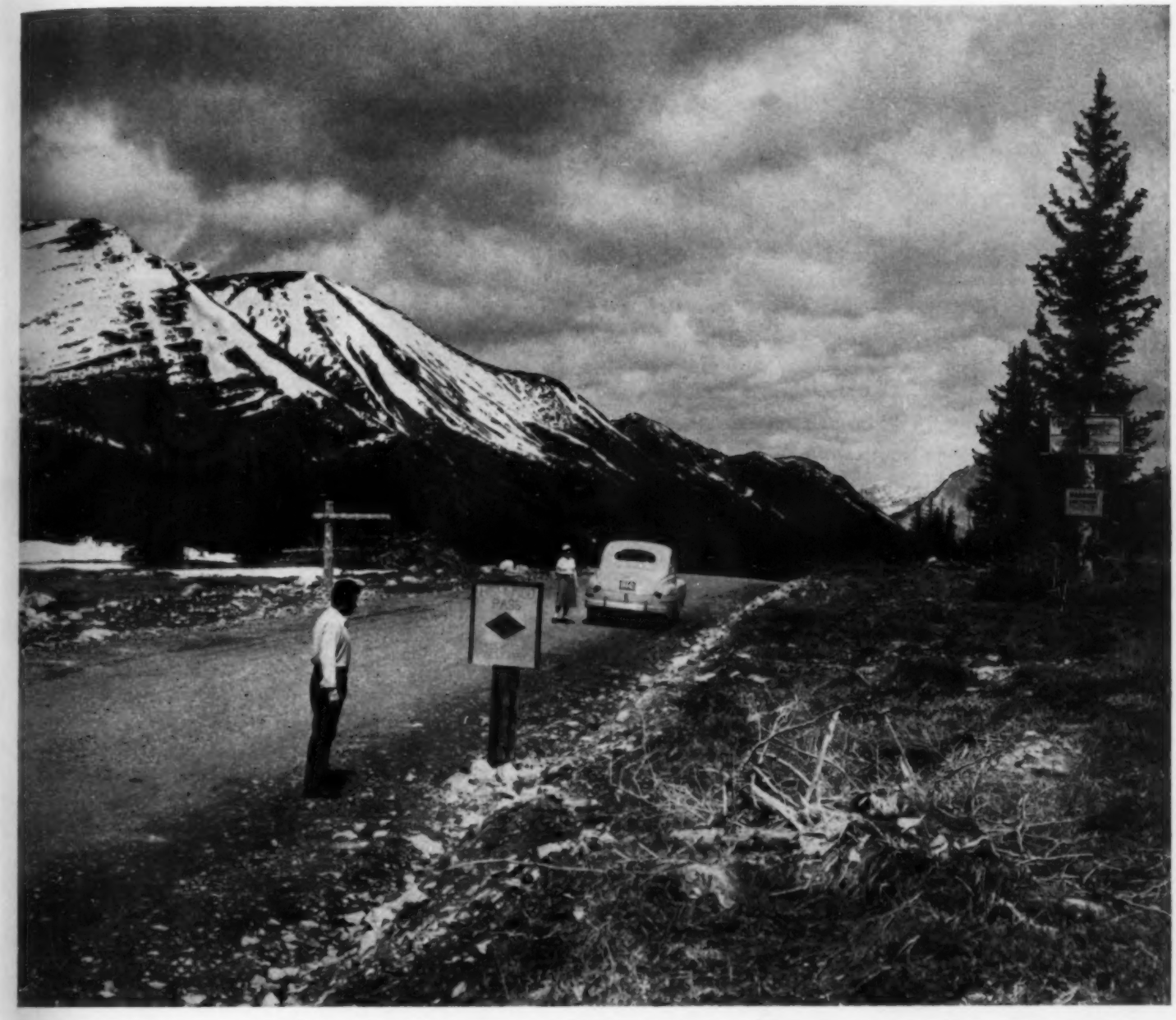
Irrigation, municipal, hydro-electric and other water uses now in operation and projected depend upon the mighty Saskatchewan River and its tributaries. From the Rockies, it straggles in two great branches across Alberta and Saskatchewan to join and flow across Manitoba, and eventually into Hudson Bay. It waters and drains our three central provinces.

The population levels of the Western Plains will be determined not so much by immigration policies, oil and gas resources, or industrial development, as by the availability of water.

The eastern slopes area is one of high water yields. High, that is, in relation to the relatively dry prairies to the east. The mountain ranges in this area influence the movement of the continental air masses resulting in higher local precipitation. Much of this falls as snow. In the fall, snow first appears on the peaks and gradually creeps down the slopes to valleys. It

King Creek canyon, one of the many rugged canyons that flank the road through the mountains.

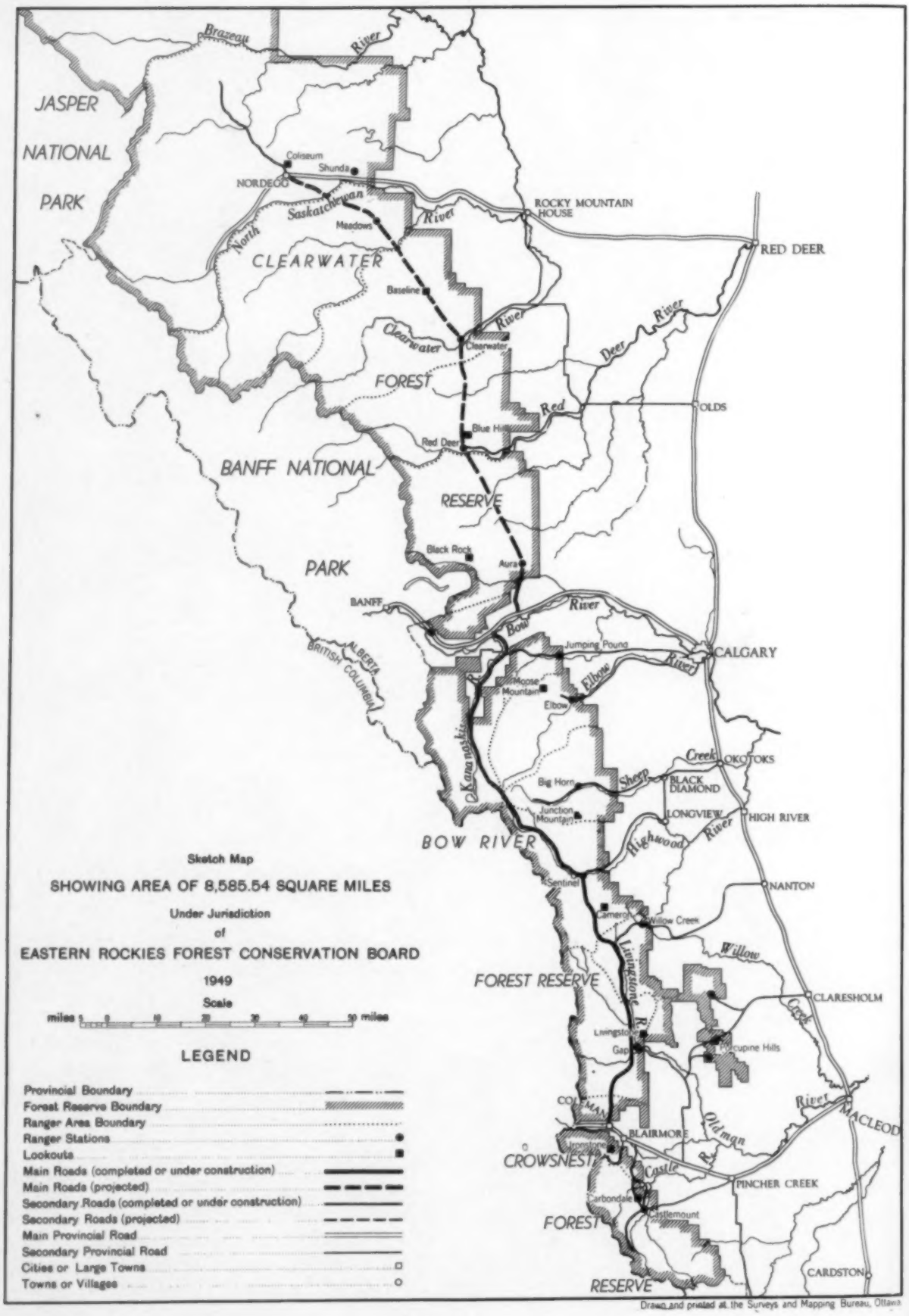
Alberta Government photograph



The highest engineered piece of road in Canada is at Highwood Summit, Mile 91, which is 7,239 feet in elevation.

piles up during the winter months and in the spring melts first from the valleys and sunny lower slopes and then more gradually from higher levels and less exposed slopes. It is not unusual for snow patches to persist throughout some summers. The snow-melt on the sheltered slopes and at high elevations is slow because of low temperatures and humid clouds. It may be claimed that it is this snow water, together with melted ice from the glaciers, which maintains the summer flow in the rivers. But the glaciers are dying—even the Columbia Icefield, called "The Mother of Rivers". When a glacier is exhausted, the flow of the mountain stream it nourished diminishes sharply. These glaciers are but a remnant of the ice age. Many of them still persist, many have already disappeared. This old stockpile of moisture from a past age is being used up at a faster rate than it is being replenished. Our present glaciers have persisted for many thousands of years but we cannot tell if they will last for thousands more. It seems more realistic to measure their future life in terms of hundreds of years.

To compensate for the anticipated decreasing flow from the glaciers, immediate steps must be taken to control the headwaters,



Sketch Map

SHOWING AREA OF 8,585.54 SQUARE MILES

Under Jurisdiction

of

EASTERN ROCKIES FOREST CONSERVATION BOARD

1949

Scale

miles 0 10 20 30 40 50 miles

LEGEND

- Provincial Boundary
- Forest Reserve Boundary
- Ranger Area Boundary
- Ranger Stations
- Lookouts
- Main Roads (completed or under construction)
- Main Roads (projected)
- Secondary Roads (completed or under construction)
- Secondary Roads (projected)
- Main Provincial Road
- Secondary Provincial Road
- Cities or Large Towns
- Towns or Villages

Drawn and printed at the Surveys and Mapping Bureau, Ottawa

reduce the peak of flood-water in spring, and the consequent shrunken flow in summer. A study was begun of soil conditions, grazing, precipitation and water run-off, and forest inventory.

Multiple-use of the Reserve was part of the program, but particular attention was paid to fire protection and grazing. Grazing by domestic stock and big game, timber production, recreation and water-yield are all part of the policy of wise land-use.

This highly significant conservation project was dramatized in July, 1952, by the formal opening of the 120-mile Coleman-Kananaskis Road, which symbolized the 531 miles of truck trails, secondary and trunk roads built by the Board. By the end of the construction season of 1953, that figure had reached 825 miles.

The agreement between Canada and the Province of Alberta resulted in the Eastern Rocky Mountain Forest Conservation Act of 1947. Long discussions preceded the pact, for, because of its potential, the Saskatchewan River is vital to the Canadian economy.

Protecting the water resources of other provinces was obviously not wholly Alberta's responsibility. The interprovincial nature of the river was evident from the first. So, by the terms of the Act, the Federal Government provided $6,300,000 to be administered over a six-year period (recently changed to seven years) in capital outlays, such as roads, buildings and equipment, and non-continuing research.

For twenty-five years, moreover, Canada and the Province of Alberta would share the expenditure of $300,000 per annum for maintenance and current costs. A recent amendment to the Act provides that the province will pay the entire maintenance up to $450,000.

A three-man Board provides plans and specifications of work, carries out inspections, and disburses the funds. Major-General Kennedy is Chairman, George Tunstell, also of Ottawa, represents the Government of Canada, while H. G. Jensen of Edmonton represents the Province of Alberta. Headquarters are in Calgary, where a full office staff is maintained, including Secretary-Treasurer J. M. Marshall, Chief Forester E. S. Fellows, and Chief Engineer C. R. Cornish.

The forest ranger at Livingstone Gap issues a travel permit. Tourists are urged to protect the forest and the wildlife.

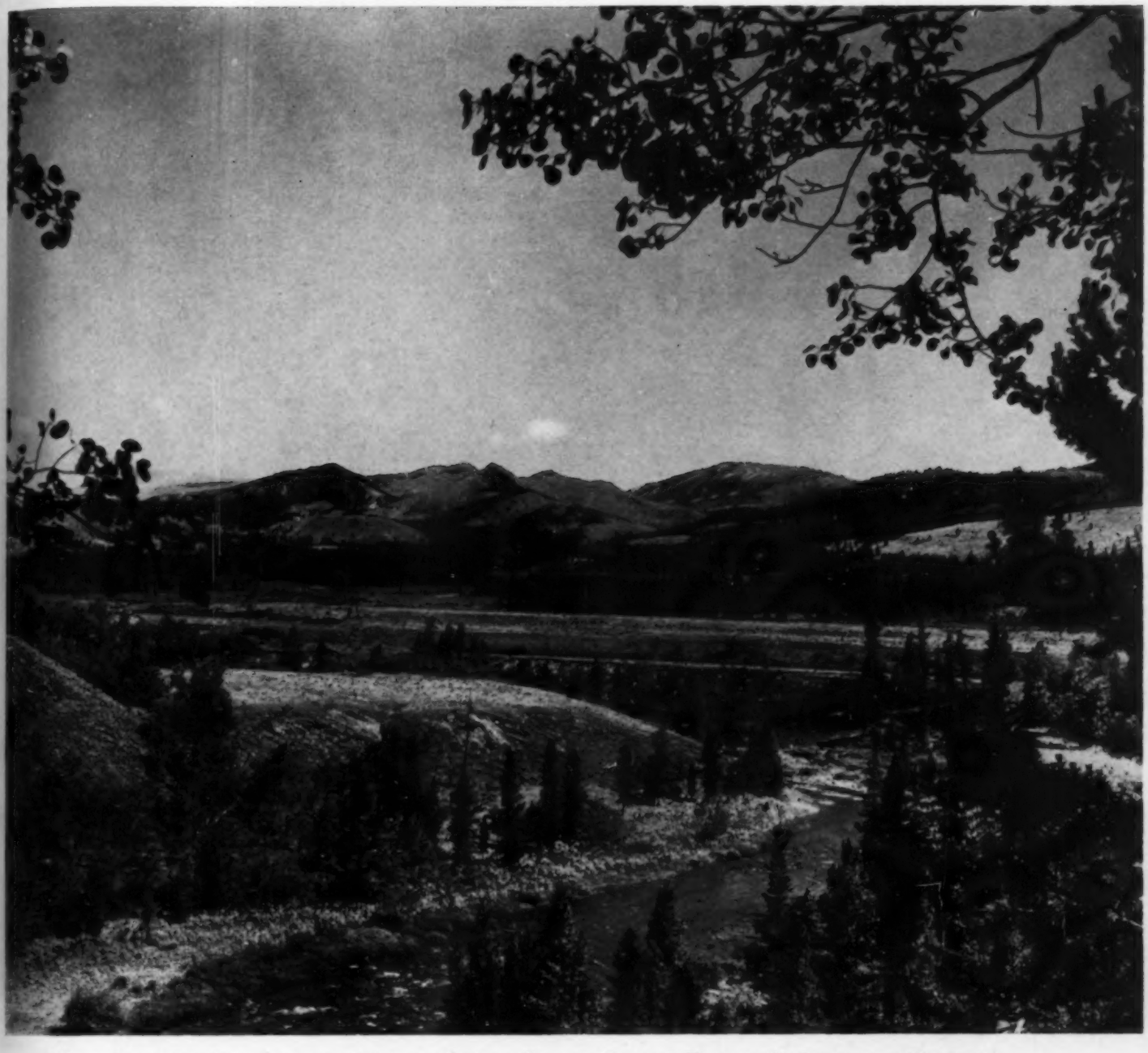
One of the half-dozen camp shelters erected along the Coleman-Kananaskis road is located at Racehorse Creek.

Outside the Bow River Forest reserve the road runs through the Kananaskis Forest Experiment Station, following the silt-laden Kananaskis River.

Of necessity, communication came first. Roads and short-wave radio had priority, for fire prevention and suppression, grazing allotments and timber berths depended upon them. Plans were laid down for a trunk road which would begin at Coleman in the Crowsnest Pass and slice through the Reserve to the Brazeau River, 230 miles north in Clearwater Forest. From it, secondary roads would connect with municipal roads to the east, and with truck trails to lookout towers.

Such projects, general construction, roadwork and fire protection are carried out by the province according to the plans of the Board. The Forest Service of Alberta was already trained in fire-fighting, supervision of cutting operations, and so forth. A splendid example of the good neighbour policy is the reciprocal arrangement between the Reserve's personnel and the National Parks, the Dominion Forest Experiment Station at Kananaskis, and the Forest Services of Alberta and British Columbia. Regardless of whether the fire is in or out of the Reserve, the nearest forest wardens move into prompt action against it.

These are not Alberta's most productive



There is great variety of scenery to interest the traveller over the road. Here are the Livingstone Flats, with the Livingstone River in the foreground. Alberta Government photograph

forests, nor most valuable in timber. But they are priceless in the matter of stream control, and regeneration is extremely slow on steep slopes where the sun bakes the thin soil. Fire is an enemy to be fought with every weapon. Preserving the mosses and marshes, the forests and the grasses is part of good watershed management.

Although constructed primarily to speed fire-fighters and forest personnel about their business, the Board realized that the wide well-gravelled trunk road, with its fine fishing and big-game hunting and its spectacular scenery would attract tourists. Criticism came from those who preferred the country in its roadless state, a wilderness untouched by man. But since the road is paid for by taxes, it seemed essential that the Canadian people be permitted to use it.

At the same time, the Board worried about irresponsible travellers setting the newly-opened forest ablaze with careless campfire or cigarette. No significant increase has been noted over the 25 to 30 fires which occur each season in the region. Twelve fires were reported the first year the road was opened, and were

caused by campers and smokers during serious fire hazard. Due to the network of roads and the radio-communication which had been installed in each look out and ranger station, the damage was held to 8½ acres. In addition, the rangers assisted in extinguishing six fires outside the Reserve.

The Board has power to close the road to travellers in time of extreme fire-hazard, or when spring freshets carry away chunks of the roadbed or rip out bridges. Actually, snow lies on the road in some of the high passes until July, and returns in October.

The ideal way is to travel from the south to get the full impact of the rugged mountain scenery. Cougar roam the woods, and mountain sheep and goats inhabit the crags. However, chances of seeing moose, elk, deer and bear are much better. There is no avoiding the colonies of whistling marmots.

A journey over the road is an adventure in time, as well as in space. At the lower altitudes, summer wildflowers such as arnica, scorpion weed, Jacob's ladder, are well advanced. At the same time, on the higher levels, mountain marigold, avalanche lily and shooting star are just coming into bloom.

Crowlodge Ranger Station is located at the beginning of the road, where the tourist fills out a form in duplicate, taking one sheet with him to deposit in a receiving box when he leaves the Reserve. This is to enable the rangers to estimate the use of their road, the traveller's reason for being there, to track down stranded travellers—hotels and service stations are banned—and to pin down responsibility for fires.

As one proceeds northwards with the Livingstone Range on the right, the first considerable height is Vicary Summit, 5,868 feet. Ahead lie the grassy bottomlands of Racehorse Creek, with the longest bridge of the journey, 140 feet, flung across it. Beside the creek stands one of the Board's dozen or so campsites, with red-roofed shelter, stove, picnic tables and fenced enclosure to keep grazing cattle at a respectful distance.

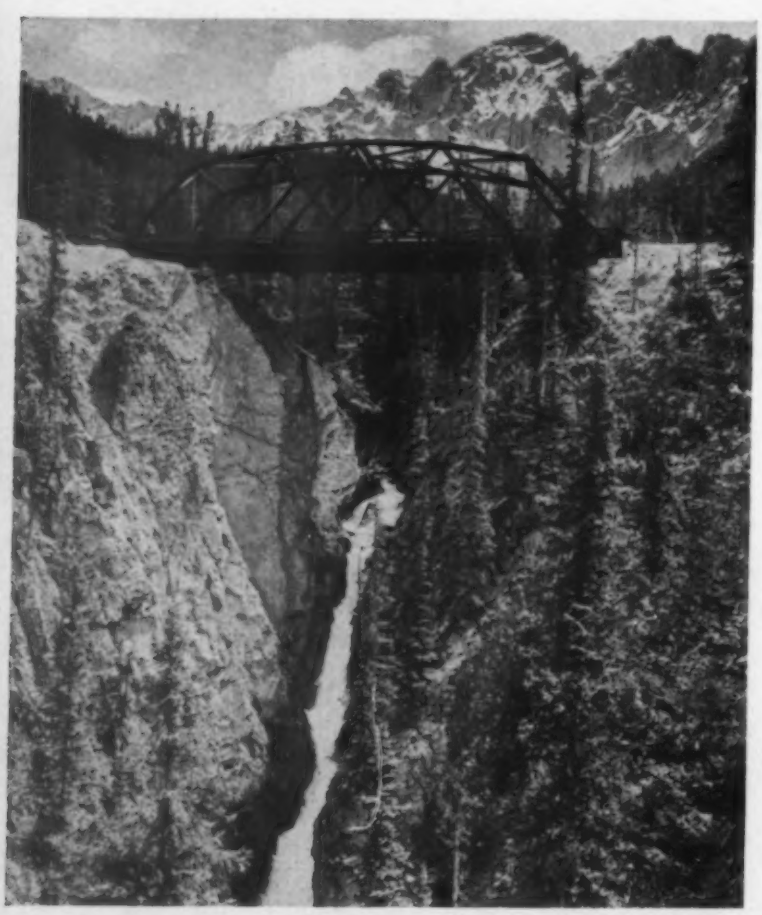
At Livingstone Gap, a short road runs to Oldman gorge, where the river plunges through the gap in the mountain range. On Thunder Mountain, just behind the ranger station, is what has been called a perfect geological anticline.

At Mile 40, you cross the Livingstone River bridge. A campsite has been set up near the falls, where the river toboggans down a rock slide in a lather of foam. Always, anywhere, along this road the sound of rushing water is in your ears. A few miles north, another secondary road swings east to the Willow Creek Ranger Station, and to the town of Nanton.

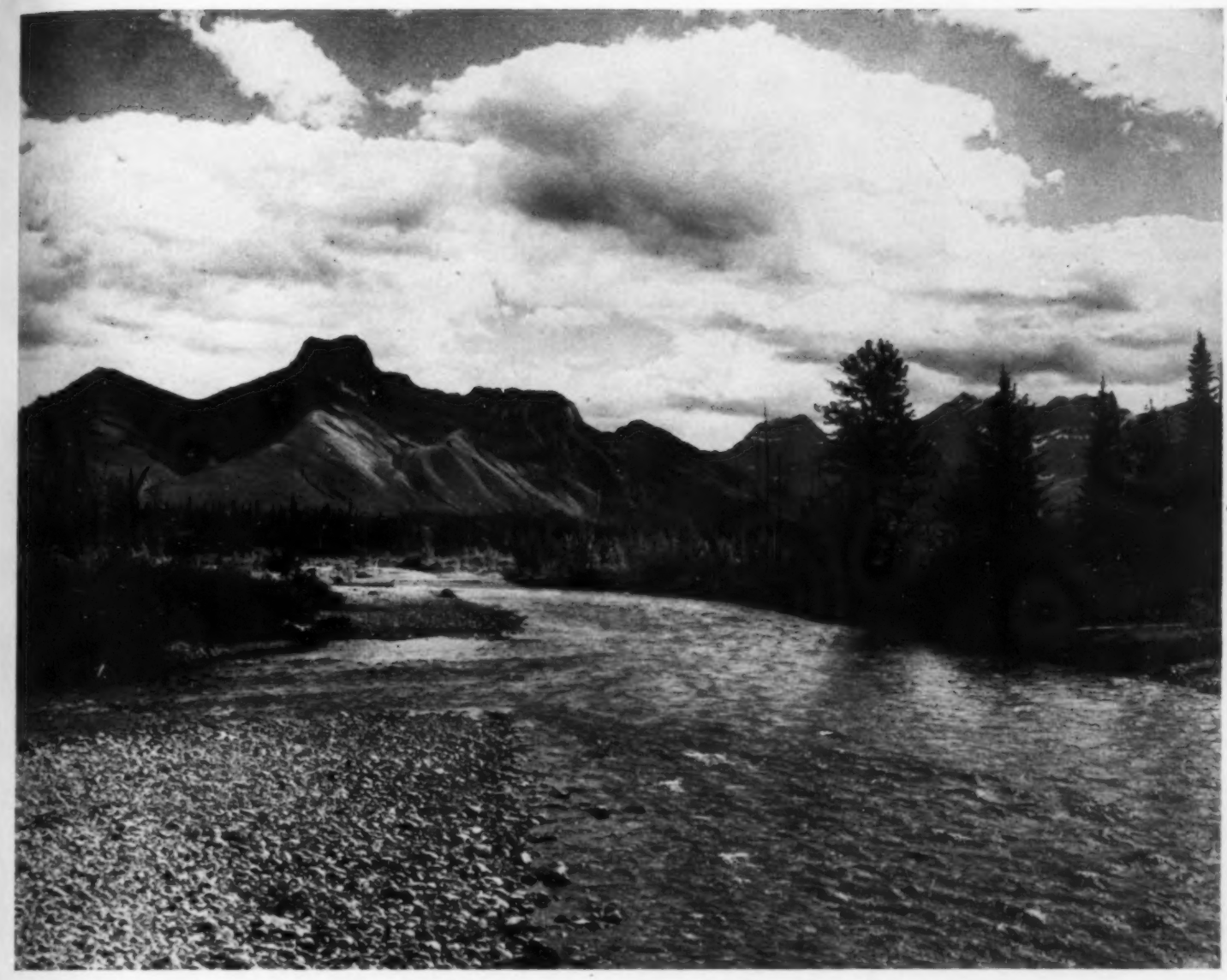
Wilkinson Summit, altitude 6,544 feet, comes next, and the road leads down through the narrow valley, crosses and re-crosses the hurtling stream. From the campsite at Cataract Creek, you can see Cameron Lookout, highest in Canada, with an elevation of 8,334 feet. In this neighbourhood are the scars of a great fire of 1936. However, logging companies have salvaged millions of feet of the dead timber for pit props and lumber.

At Highwood River, the road forks again, the branch heading east to Sentinel Ranger Station and the settlements of Longview and Okotoks. In this area, twisted graceful limber-pines clutch rocky outcroppings.

And now the road climbs higher, flanked by snowy peaks nine and ten thousand feet high.



The narrow white water of Elpoca Falls hurls itself under the bridge, with the peaks of Opal Range forming a scenic backdrop.



Ribbon Creek, seen coming in from the left, flows into the Kananaskis River about sixty miles from Seebe.
Alberta Government photograph

The avalanche slopes are littered with debris of broken trees, snapped off in the relentless snowslides. The road tops Highwood Summit, 7,239 feet, the highest engineered road in Canada, and only 200 feet below timberline. In spots, the snow is coated with the pink stain of red algae.

The road slides down the valley of the Pocaterra, through forests of alpine larch and spruce, between the jagged Pocaterra Peaks and the mighty buttresses of Mounts Rae and Arethusa. At a switchback, you have a view of the upper Kananaskis Basin and its sapphire lakes. Then down the wide forested valley you go between Kananaskis and Opal Ranges. Elpoca Creek hurls itself underneath a bridge where its mist produces a different type of vegetation in the gorge.

Mile 119 is in the northern entrance to the road built by the Eastern Rockies Forest Conservation Board, and here your driver deposits his travel permit. The following 20 miles are over a provincial highway through the Kananaskis Forest Experiment Station area, across the Bow River at Seebe, to the Banff highway.

Here and there along the road, you can hear the bulldozer's growl as it bites through the earth and topples lodgepole pines. New trails are being constructed to ranger stations and lookouts, and both trunk and secondary roads require considerable maintenance.

North of the Bow River, and 25 miles east of Seebe, the trunk road resumes its northward course. At present, 52 miles are gravelled and open to the public, and construction forges

ahead. The route has been mapped out in sections to the Brazeau River, and parts of it completed, but road construction is both difficult and costly in the Clearwater Forest.

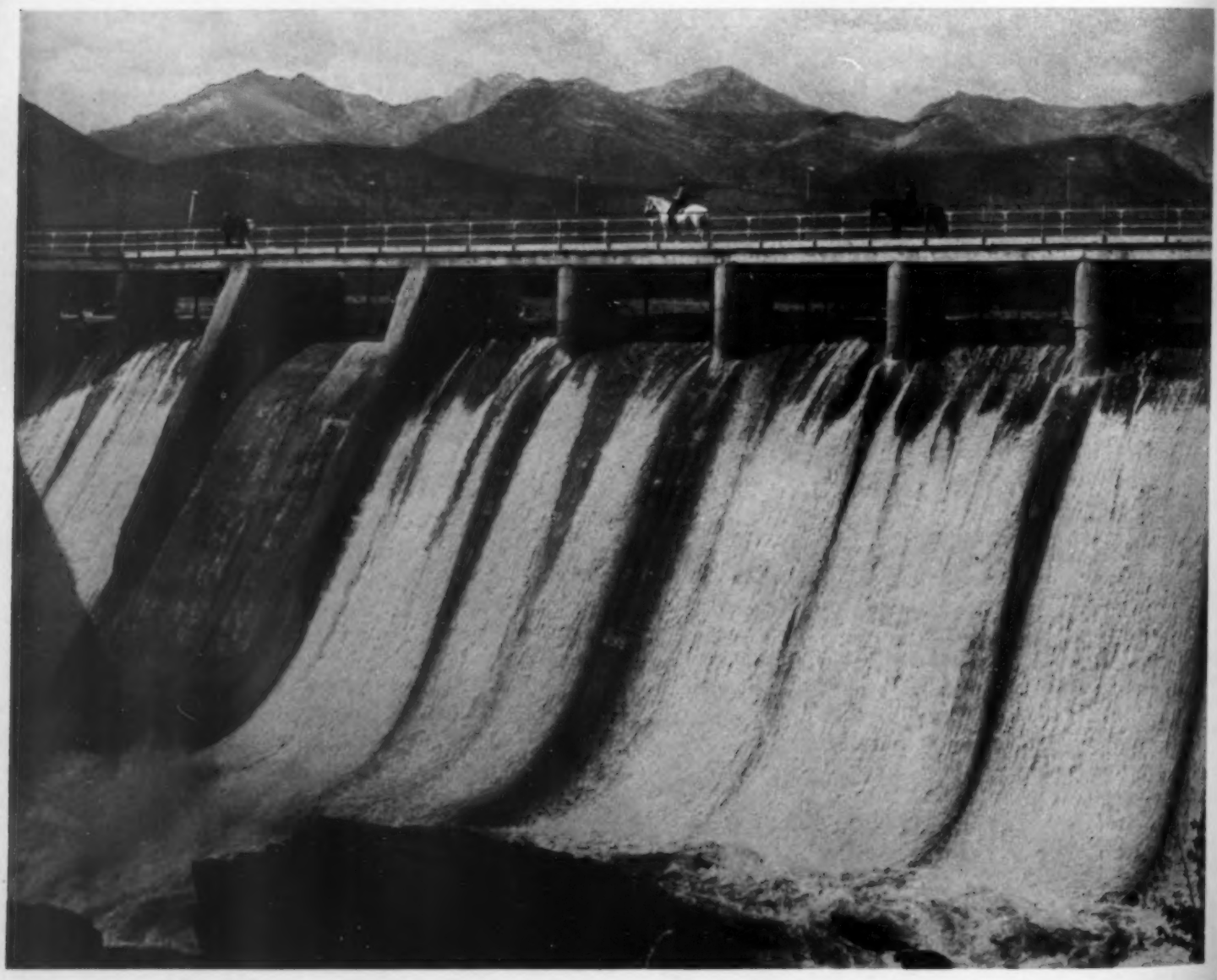
Bridging the mountain streams is the greatest problem, for the glacial rivers are wayward in the extreme, carving out new channels through gravel terrain, uprooting large trees. Although road crews may abhor the current and its damage, they realize that water is the lifeblood of our agriculture and of our cities.

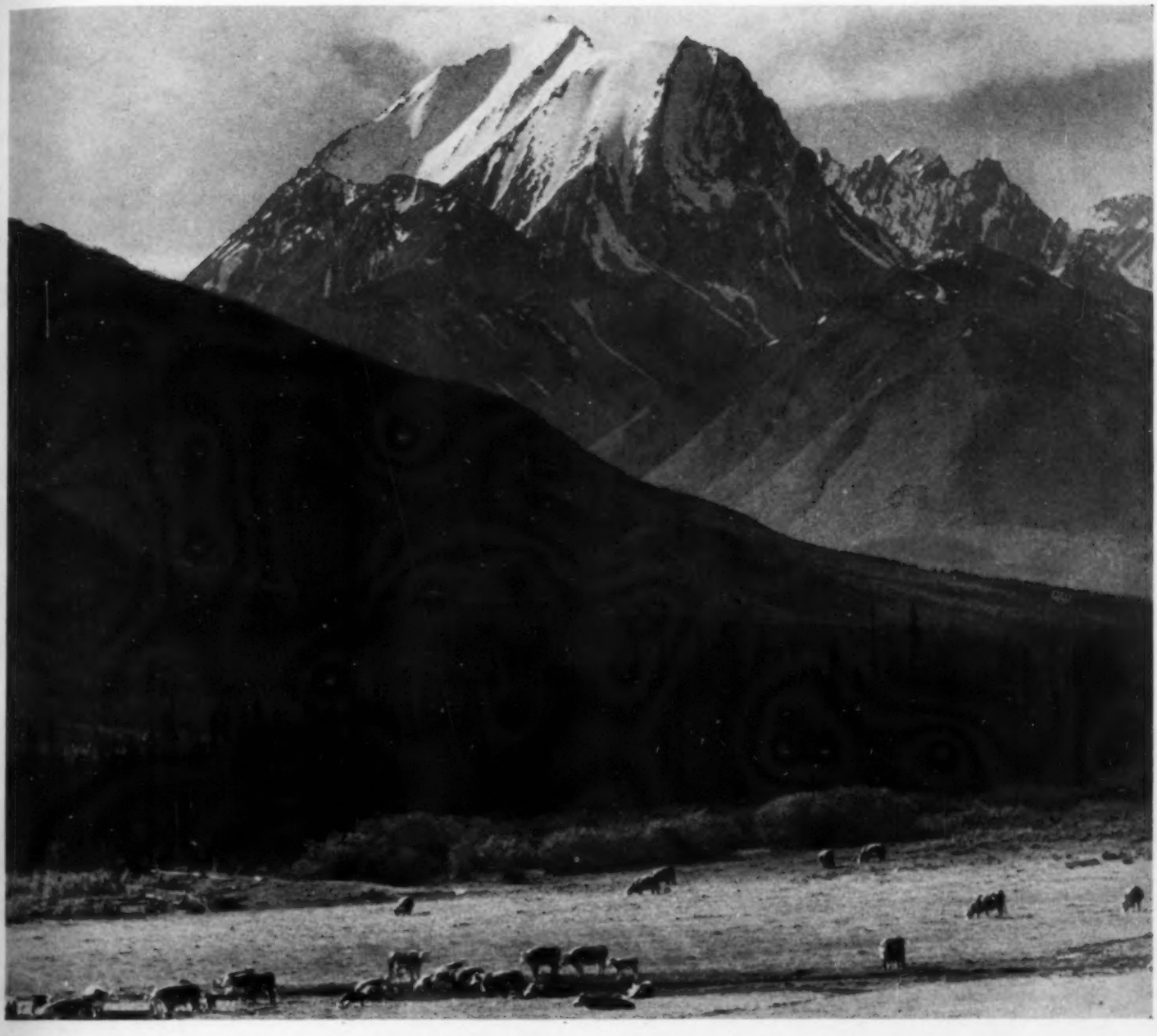
Yearly, mankind plans new and more extensive uses for the shrinking water supply. And in its plans, the Board recognized water as the most valuable resource. For example, at an assumed value of $1.75 per acre foot, the Oldman River drainage alone has a potential value of half a million dollars annually. Therefore, all activities had to be subservient to good watershed practice. Much survey and research were necessary to make the broad decisions on policy needed for wise development and long-term administration.

Extremely few data were available on the quantity and behaviour of the water, since the region was formerly accessible only by packhorse or on foot. Something was known of precipitation, a little on the run-off. But there were no scientific findings on ground-water storage or replenishment, nothing on losses due to transpiration or evaporation.

Augmenting summer flow was considered of prime importance, more so than growing trees for lumber, or other types of forest utilization.

The Calgary Power Company has a dam and hydro-electric station at Seebe on the Bow River. The Conservation Board intends to keep such rivers running, and such developments alive.





The Forest Reserve plays host to some 23,000 cattle each summer. Here Hereford cows and calves graze in the shadow of Mist Mountain.

"It may well prove," said Major-General Kennedy, "that a combination of trees and grasses or shrubs will be more effective than dense forests in impounding in the soil water resulting from the melting of snow in forests and above the tree line. It may well prove that we can reduce transpiration losses by creating less dense forests than now occupy much of the area."

One objective of good watershed management is to use the soil mantle for temporary storage of water. To accomplish this conditions must be favourable for water to infiltrate into the soil. The forest with its litter of leaves covering the ground provides ideal conditions. Grassland, provided it is not too heavily grazed, is also satisfactory. With an increase in the amount of water entering the soil there is a corresponding decrease in the amount running over the surface. It is this surface run-off which may give rise to erosion, with peak loads of sediment-laden water. Water which finds temporary storage in the soil is released slowly to springs and streams and is crystal clear.

Construction of the road and trail system made it possible to go out after the facts, and study these problems scientifically. Over the years, the Board has established weather

stations at the ranger headquarters, and a chain of precipitation gauges in valleys, on slopes and even mountain tops. Some of these gauges can be checked monthly; others, more remote, only a few times a year. They yield valuable comparative data concerning precipitation at different elevations.

On the whole, the Board found the watershed in good condition. In the grazing areas, a few localized spots had been mismanaged, so that erosion had set in. These were usually the result of poor handling of cattle, or the improper location of fences or saltgrounds. To repair the damage, numbers of cattle were reduced, grazing deferred in these spots until later in the season, and methods of improved distribution were started.

Over a four-year period, the Reserve was systematically surveyed as to its carrying capacity for both domestic stock and big game. Permanent transects have been set up, so that the range can be assessed quickly each year, comparing areas under use with a number of exclosure plots.

Good precipitation in the last several years has meant abundant summer grazing. And these grazing allotments are precious to the rancher, both financially and in a better balance of his land-use. Annually, the Crowsnest Forest alone puts nearly $500,000 worth of beef on the cattle grazed there.

Under proper range management, grazing is valuable to the forest itself, by preventing the grass from becoming long and dry, and thus a fire hazard. The number of stock each management unit can carry without deterioration is carefully calculated, and rangers make frequent inspections to guard against malpractice. For four months each year, the Reserve carries about 23,000 head of livestock, mostly cattle, for some 300 permittees. Most of these are south of the Bow River, and the demand is greater than the carrying capacity. North of the Bow are areas which can be developed to provide good cattle range.

Yet sustained forage yield and good watershed management depend upon conservative use. This was not immediately apparent to stockmen. However, increased understanding has changed their attitude to one of cordial co-operation. Rangers attend short courses in forestry and range management, and have a clearer conception of the Board's objectives. Grazing associations recognize now that good range management is to their own long-term advantage.

Among the problems which remain unsolved, two are outstanding.

Bands of stray and wild horses still roam the Reserve—2,000 of them in Clearwater Forest alone, it is estimated. A program to reduce their numbers has been going on for three years, with partial success. Stricter measures to prevent straying of domestic horses have proved helpful.

The other problem is that of the elk which seem to be over-populating the Crowsnest area. Being extremely adaptable animals, they accommodate themselves to heights or valleys, so that on the higher elevations during the summer they compete for the mountain sheep's winter range. Although they forage in the valleys during winter, they do not seriously damage the cattle's summer range. A continuing study is going on, including a census of the elk population. Some rangers recommend a longer shooting season.

Game and fish are plentiful in the Eastern Rockies area. At least five different species of trout are found in the streams, and some waters contain lake trout, Rocky Mountain whitefish, and pike. Some rivers and their tributaries are closed in alternate years, and any ranger can supply a sketch map showing which streams may be fished that season.

Hunting and fishing and camping and other recreations are important, the Board considers. But more valuable than the tourist trade are the formerly inaccessible stands of timber. Timber berths, where trees grew and matured and fell unheeded, now resound to the ring of the axe and the whine of the buzz-saw.

Sawn lumber, timber for the coal mines, firewood, fence posts and rails, building logs and other miscellaneous products brought the estimated over-all total to approximately 8.75 million cubic feet in the 1951 season. The figure is gradually rising—65 Timber Licence Berths are now leased—as more of the area comes within harvestable reach. In the 1952-3

season, 44 million board feet of lumber were removed, and 5.7 million cubic feet for mine props. As in previous years, a good part was fire-scorched logs.

Logging operations come under strict control, and penalties are severe for operators who cut stumps too high, or otherwise attempt to "mine" the forest resources. Similarly, when a water-level is raised, the standing timber must first be removed. An example is the new Three Sisters Dam of the Calgary Power Company. More than 3,869 acres of timber were cleared for roads, transmission lines, storage reservoirs, canal and head pond. Sawmill operators moved in portable mills, and kept clearing ahead of the rising water so that no timber was submerged.

Lumbering, grazing and increased tourist use of the Reserve are actually by-products of the research and multiple-use plans of the Conservation Board. Yet they are more obvious than the long-term objective of water control, and are more easily measured.

In the Act of 1947, the sum of $300,000 per annum was earmarked for maintenance and other current expenditure. Towards this amount, the Province of Alberta contributed $125,000 or the income from its surface rights, whichever was the greater. That has been changed, as already mentioned, to the point where the province contributes up to $450,000 per annum.

Revenue from surface rights has climbed steadily, as a result of opening up the country. In the fiscal year of 1952-3, the net income was $469,939—a sum more than adequate to meet commitments. It is concrete, tangible evidence that the plans and ideals of the Eastern Rockies Forest Conservation Board are already justified.

The Spray Lakes come within the Forest Reserve managed by the Conservation Board. When dammed for power in recent years, the timber was first salvaged, with obviously worthwhile results.

After classroom instruction in Edmonton, the class of 35 airmen is driven by bus 150 miles west. Each with his own complete equipment in pack hikes six miles through bush to the base camp on McLeod River.

School for Survival

by PHIL SHACKLETON

Photographs by Capital Press Service.

ANYONE can survive in the Arctic. With a minimum of the right equipment and the ability to use the resources of the northern barren or bush country, you need not die if marooned somewhere in the northern wilds of this continent.

That is what the Royal Canadian Air Force is today drilling into the men who make up its air crews. At the R.C.A.F. Station at Edmonton, Alberta, at a bush camp 150 miles to the west in the foothills of the Rockies, and at a winter camp at Cambridge Bay, in the Northwest Territories, instructors who are experts at living off the country are teaching 2,600 men each year how to survive if they make a forced landing in the winter northland.

In the winter of 1942, a Mitchell medium bomber with a crew of seven American airmen came down in 40° below zero weather on the coast of Labrador. They had not been trained in winter survival techniques, nor were they properly equipped for flying in such country. The seven men had only four sleeping bags. For food they had eight cans of chicken à la king, three cans of peanuts, five cans of fruit, crackers, cheese, fig bars, chocolate bars, tinned meat, candy and 24 bottles of soft drinks. The supplies were adequate for a picnic, but the Labrador coast is not recommended for a holiday outing in December.

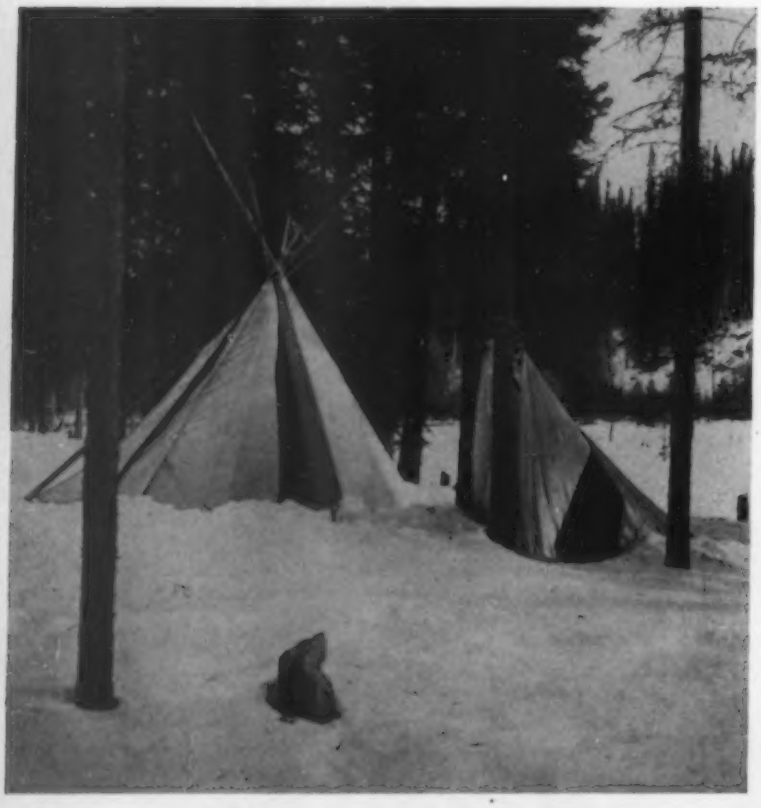
There was nothing wrong with the morale of the crew members. The diary they left proves

Water hole on Wapiti Lake is marked with fir sapling. When ice is thick snow is melted for water.

Civilian instructor is available, but camps in lean-to by himself when accompanying trainees on trek.

On trek in bush crew of nine sets up brush shelter. Entrance flap, by man, is weighted with sapling.

Parachute has many uses. Here, one 'chute is used to make Indian style tipi, another forms lean-to. Above, one covers a brush shelter. These shelters are warmer than metal plane body.



that. But with little knowledge of the country they did most of the wrong things and few of the right. They saw game, and although they had firearms they did not go after it.

They should have built a warm lean-to shelter of boughs; instead, they shivered inside the freezing aircraft cabin. They should have had more sleeping bags instead of blankets. They should have been equipped with a primus stove and proper survival rations. And they should have explored the surrounding area in search of help.

The crew of seven came down safely, but they remained at the plane and all died, two months later, of exposure and starvation. Fifteen miles away, they could have found shelter, food and rescue at an Eskimo village.

The Survival Training School operated by the R.C.A.F. was established to prevent needless casualties of this sort. And although few may ever be called on to use the training, the course serves a very valuable morale-building

Trainees practise for an emergency by using bow and spindle stick to make fire at trek camp in bush.

function in dispelling that strong fear of the Arctic. Most Canadian airmen will at some time be flying over the north. With survival training behind them, they understand how to cope with the Arctic and realize that a forced landing may mean discomfort but not necessarily tragedy.

Once a week at the R.C.A.F. Edmonton station, forty airmen arrive to begin the fourteen-day course. Three days at the base are given to lectures, films and classroom instruction. But you cannot teach survival in the schoolhouse, so the class then moves to a bush camp in the foothills of the Rockies, 150 miles west of Edmonton. Six days here are devoted to instruction and demonstration out of doors and often at temperatures below zero.

Completing base camp instruction near the Alberta village of Hargwen, each class is sent on a five-day trek. With packs and equipment they hike to designated areas, where they must build shelters and live on special survival rations plus any game they can catch.

The purpose of survival is to be rescued. On frozen expanse of Wapiti Lake crew lays out signal fires and huge letters formed from boughs. When plane is heard the fires are lit.

Following instructions on how to skin game, snared rabbit is prepared for the community pot.

Each crew of eight or nine is equipped with a shotgun. By this time, too, they know how to set snares for rabbits, birds, squirrels and even mice, lemmings or other small animals which will provide meat for the pot. Few crews go through the five-day trek without supplementing their issue rations with bushland game of some kind.

In the bush, student airmen soon learn that one of the most valuable pieces of survival equipment is a parachute. The nylon life-saver can be used to improvise a tent, a lean-to or a roof for a large brush shelter. Shroud lines are unbreakable and serve a dozen purposes. Unravelling the shrouds, the survivors can secure threads that make fish net material, snares and so on.

Each man on trek must improvise a useful piece of equipment before he returns to base camp. Since the course began, the school has collected a remarkable exhibition of life-saving gadgets which include carved eating utensils, bows, fish nets, snowshoes and spears.

On completion of the bush survival training, the forty-man class is flown from Edmonton to Cambridge Bay on Victoria Island north of Canada's mainland. For a week, the regular instructors plus two Eskimos put the airmen through an arctic survival course.

From January till April, one class after another is taught how to build snow houses, how to obtain food in the Arctic and how to fish in waters that may be covered with up to 70 inches of ice.

Survival training instructors are not just other airmen who have graduated from a course. From the commanding officer, Squadron Leader Scott E. Alexander, down to the NCO's and civilians who round out the training staff, all instructors are men who have lived in

Making a fish net of nylon threads taken from one parachute shroud line.

Snowshoes improvised from boughs, wire, and shroud lines are invaluable in deep snow.

Survival crew on its fourth day in the bush is cheerful, comfortable and content. Two weeks earlier men would have been practically helpless if marooned in bush.

Trainees wear on feet factory-made mukluks of nylon and rubber. In snowshoe picture (below, left) the genuine mukluks are Eskimo-made.

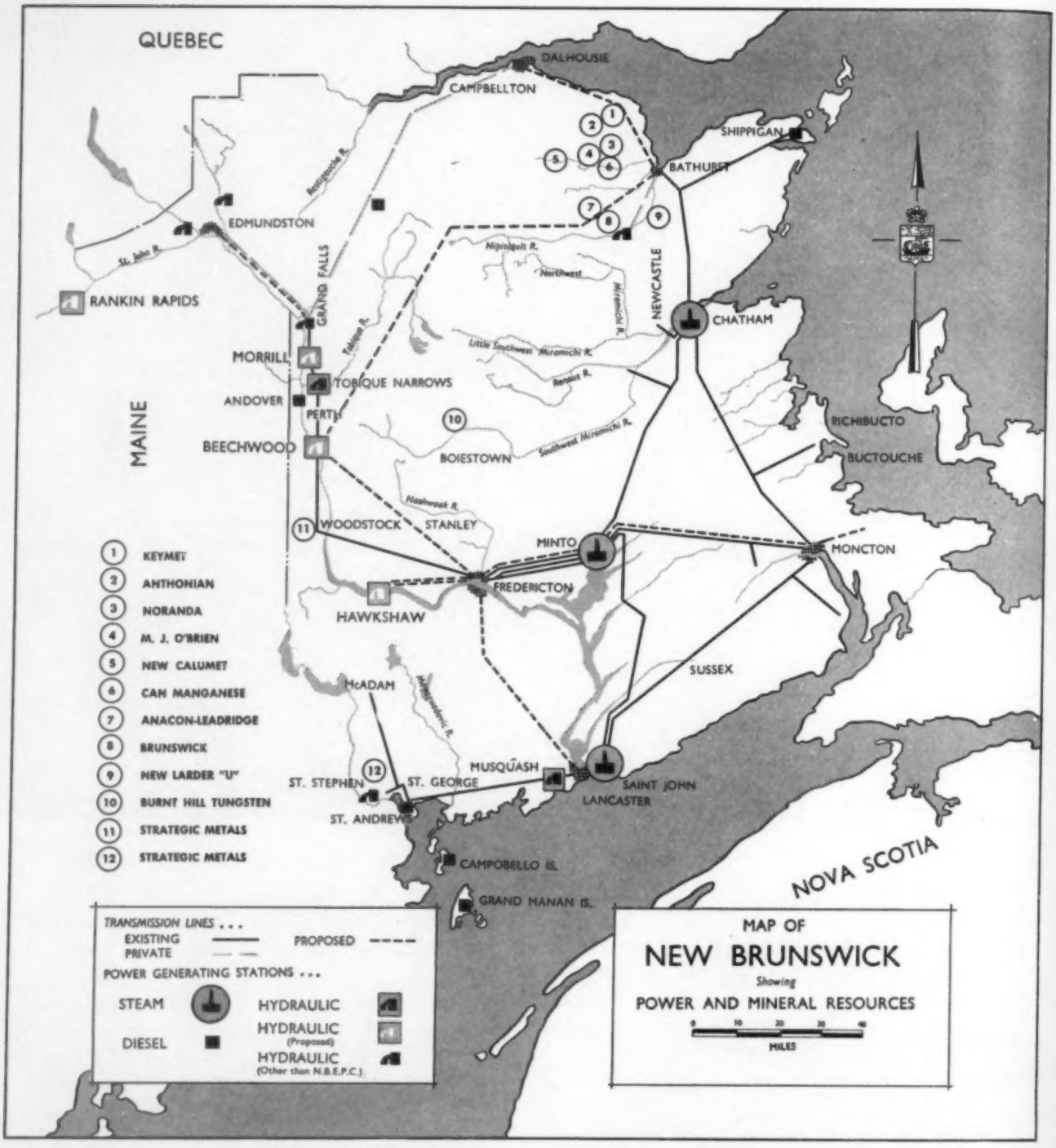
the Arctic or the northern bush. Alexander and his chief instructor, Flight-Lieutenant Reg Goodey, are former Mounties who have worked many years on the polar side of the Arctic Circle. Both speak several Eskimo dialects and together they have spent months on arctic trails, living entirely off the inhospitable country.

The staff of twenty-seven includes airmen and civilians who have been forest rangers and trappers. All of them are as much at home in the mid-winter bush as they are in steam-heated apartments. And the Eskimos on the staff at Cambridge Bay live in a region where life for much of the year is always a matter of survival.

The Survival Training School has the reputation of being the toughest course of its kind in the world. So far, there have been no serious casualties. On the other hand, survival rations for a week or two often send men back to their regular duties 10 to 15 pounds lighter. Some underweight airmen, on the other hand, have completed the course with extra poundage.

Today, the course is not limited entirely to R.C.A.F. personnel. Canadian Army officers and men are frequently among the trainees and from time to time American airmen and instructors go through the rugged treatment.

In this breathless age, the Royal Canadian Air Force is training its men to pilot jet planes that rival the speed of sound. It is training mechanics to cope with the intricacies of the most complex gas turbine engines. But at the Survival Training School, it is bringing its airmen briefly back to earth, to teach them the basic arts of the stone age so that if the marvels of the modern age fail them, they will be equipped to survive even in those parts of the world where civilization is still only a rumour.



Electrifying New Brunswick

by WALTER A. DIXON

NEW BRUNSWICK is on the threshold of a new and prosperous economic era. A base metal deposit, recognized as one of Canada's greatest, has been located in the northeastern section of the province. Large deposits of high grade ore which contain zinc, lead, copper, silver, and tin have opened up an entirely new perspective. To cope with development, potential power must become real power in the form of electricity. This spur to the generation of

more power will, in turn, help to satisfy the ever-increasing demands of domestic consumers, to whom electricity becomes more and more important in daily life.

Let us for a moment try to picture the scene when evening shadows fell on a New Brunswick city or town in 1890.

Darkness began to envelop the community like a shroud, penetrated here and there by the fluttering of carbon arc-lamps so harsh that their use was confined largely to non-residential buildings such as factories and drill halls. Gas lights, candles, and kerosene lamps were the only means of providing illumination for the homes of that day. Regardless of how sentimental we become about the good old days, very few of us would want to exchange them for the good new days in which we work and live.

It was just before the turn of the century, in 1898, that New Brunswickers had their first glimpse of the wonder that was to become one of the greatest factors in bringing Canada so high a standard of living. In the lumbering community of Campbellton at the mouth of the Restigouche River a small steam plant was erected and a handful of venturesome citizens stored their candles and kerosene lamps.

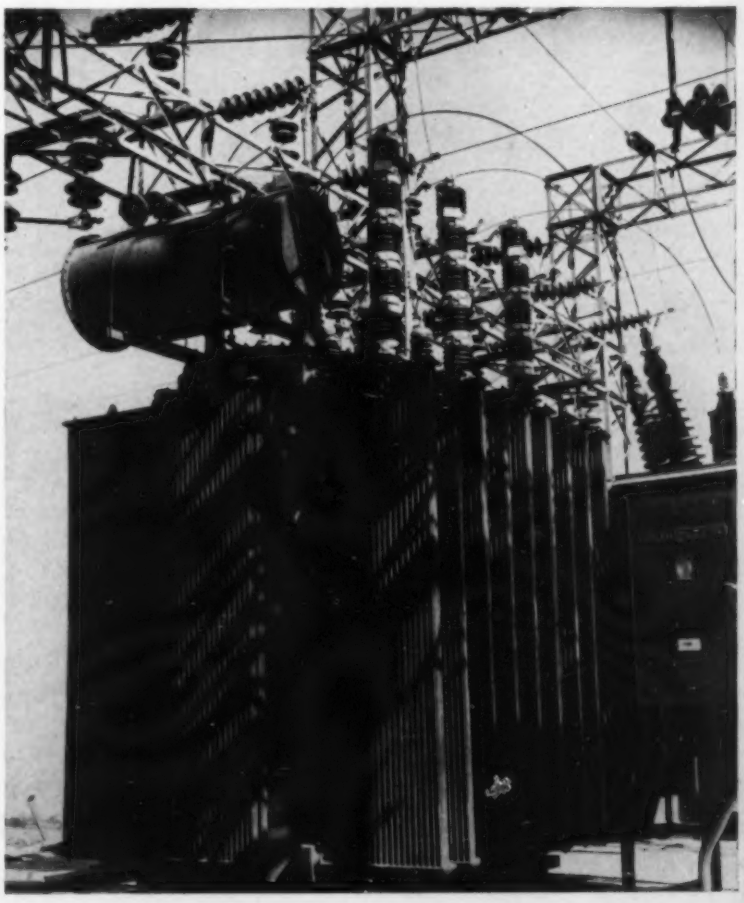
Before many years had passed, other provincial communities joined the march of progress and similar installations followed in fairly rapid succession. The little college town of Sackville on the Nova Scotia border got its first electricity in 1901. Then came Moncton in 1902, closely followed by Fredericton, Loggieville, and Newcastle in 1903. In 1905 the Saint John Railway Company, which had been supplying gas to the city of Saint John installed two 2,000 horsepower generating units and began to supply New Brunswick's largest city with electricity.

Most of these early electric plants were powered with fuel, still the main source of power in the province. The first attempt in the province at the conversion of the power of falling water into electrical energy was made in 1904 on the Meduxnekeag River, a tributary of the St. John, about two miles from the town of Woodstock. This initial hydro development operated under a thirty-foot head and generated a maximum of 500 h.p.

In the ensuing years hydro plants were constructed on other provincial rivers. The Maine and New Brunswick Electric Power Company Limited, who at that time were serving a number of municipalities in northern Maine, installed two 750 h.p. units on the Aroostook River in 1906. The capacity of this original plant was later increased to 13,950 h.p. Following this, the municipality of Edmundston built a small hydro plant on the Green River which, flowing from the northeast, empties into the St. John eleven miles below the town. This 550 h.p. development began transmitting its energy to Edmundston in 1912.

Realizing the growing need for power in the Bathurst area and to supply the increasing requirements of their paper mill, the Bathurst Company Ltd. commenced construction of a hydro plant at Great Falls on the Nipisiquit River in 1919. Surplus power from this 13,400 h.p. development was sold to the provincial commission for distribution in the eastern section of the province.

By 1918, approximately twenty organizations in the province, both public and private, were engaged in the business of generating and distributing electricity. Their distribution systems were confined mainly to the larger centres of population, but there was pressing demand



A 20,000 kilovolt-ampere water cooled transformer at New Brunswick's new Grand Lake steam plant No. 2.

in rural areas for electric service. In the same year, 1918, the Water Power Commission of the Province of New Brunswick was established by Order-in-Council, primarily to investigate the water power resources. In this study they had the co-operation of the Water Power Branch of the federal Department of the Interior. Power sites were surveyed, stream measurements and other technical investigations were initiated, and in 1920 the Commission was able to report their findings to the provincial government, which lost no time in acting on their recommendations. It was in the same year, 1920, that the New Brunswick Electric Power Act was passed by the Legislature, and a new Commission was set up to generate and distribute electric power under public ownership.

This act followed closely the lines of the Ontario Commission which had been in existence since May 1906. It gave the New Brunswick Commission wide powers as the whole purpose of the act was to facilitate the generation and wide distribution of electric power throughout the province.

The site chosen by the new commission for its first hydro development was near the mouth of the Musquash River, which flows into the Bay of Fundy about fifteen miles west of the city of Saint John. One branch of the river had to be diverted and an unusually long penstock constructed. Today, after thirty years of continuous service, this hydro plant (operating at 9,000 h.p.) is still efficiently producing at the rate for which it was designed.

In 1924, a year after completion of the Musquash plant, the commission was authorized to make a study of the potential power at Grand Falls on the St. John River. It was found that the site had been leased to the Grand Falls Power and Boom Company in 1895 for the development of power and the manufacture of lumber. However, this company and three succeeding companies had entirely failed to produce any electrical power. It was not until 1925 that the site was finally developed by the Saint John River Company, a subsidiary of the International Paper Company. Three 20,000 h.p. units were installed, and a fourth added later.

During the following years, the New Brunswick Electric Power Commission was engaged in extending its distribution lines over much of the southern part of the province. From the main transmission line built in 1924 from the Musquash plant through Saint John to Moncton, branch lines were built and by 1930 the towns of Fairville, Hampton, Norton, Petitcodiac, and Shediac were receiving power from the commission.

By this time blocks of power were being sought by industries and there was a growing demand for electric service from the rich farming area in the St. John River valley. It was decided that the commission should construct a steam plant at Newcastle Creek, virtually on top of the Minto coal fields. In September 1931 a 6,600 h.p. steam plant, burning bituminous coal, began transmitting its electrical energy to the city of Fredericton and the textile

Overlooking the Maine and New Brunswick Electric Power Company's Hydro Plant on the Aroostook River in New Brunswick. This 13,950 h.p. development was completed in 1923 on the site of the original plant which went into operation in 1906.

Grand Falls on the St. John River from an old glass negative taken in 1902. The building on the left bank was a grist mill which was operated by a water wheel. The tiny tail race which can be seen emptying into the gorge is an indication of the percentage of the power potential being used at that time. The dam of the hydro development built in 1925 is located about 200 feet above the falls.

mills of Marysville. In 1936, to meet the steadily increasing demand for power, the commission stepped up its capacity at Newcastle Creek with the addition of a 7,500 h.p. unit.

Through the years from 1936 to 1950, New Brunswick's Power Commission was hard pressed to produce the power being demanded by the people of the province. Six diesel generating plants were built and a 15,000 h.p. steam plant was added to the system at Chatham. As the number of customers rose from 17,000 to 52,000 plant capacity increased by nearly 400 per cent. During this time, expansion of transmitting facilities and local distribution lines had to keep pace with increased generation and consumption of power.

In 1945 it was realized that in order to build

Located on the Nepisiquit River about twenty miles from the town of Bathurst, this 13,400 h.p. hydro plant was built in 1921 by the Bathurst Power and Paper Company Limited.

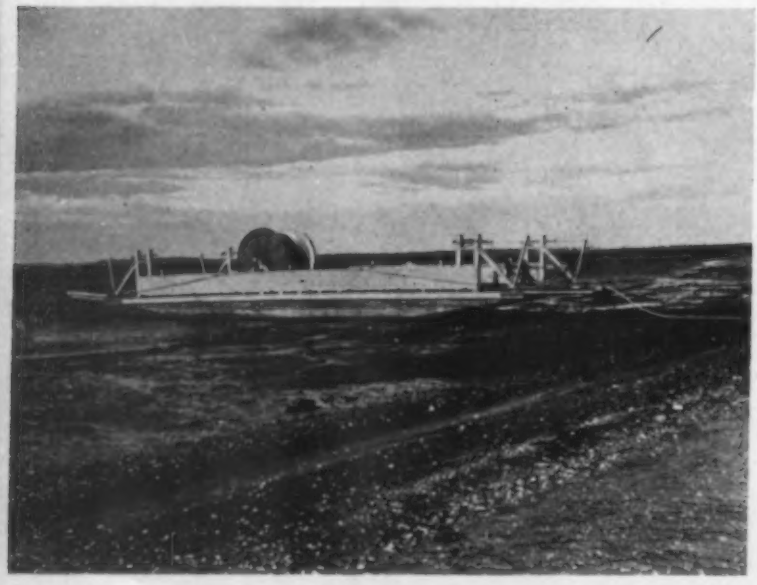
The Gatineau Power Company's dam on the St. John directly above Grand Falls. A head of 125 feet is utilized by the power house at the foot of the gorge.

economical plants long range plans, based on estimated future demands, would have to be made and that studies of hydro projects would have to be completed at least three years before the additional power would be required. Studies of the proposed Beechwood site on the St. John River were carried out by the New Brunswick Resources and Development Board and a survey was made of the power potential of the Tobique River. Results of the Tobique survey indicated that an installation of 27,000 h.p. would be economical. It was realized by the government of the day that the development was essential and that when demand warranted the construction of Beechwood, it would profit by the run-off control provided by the Tobique River storage dams on its drainage basin.

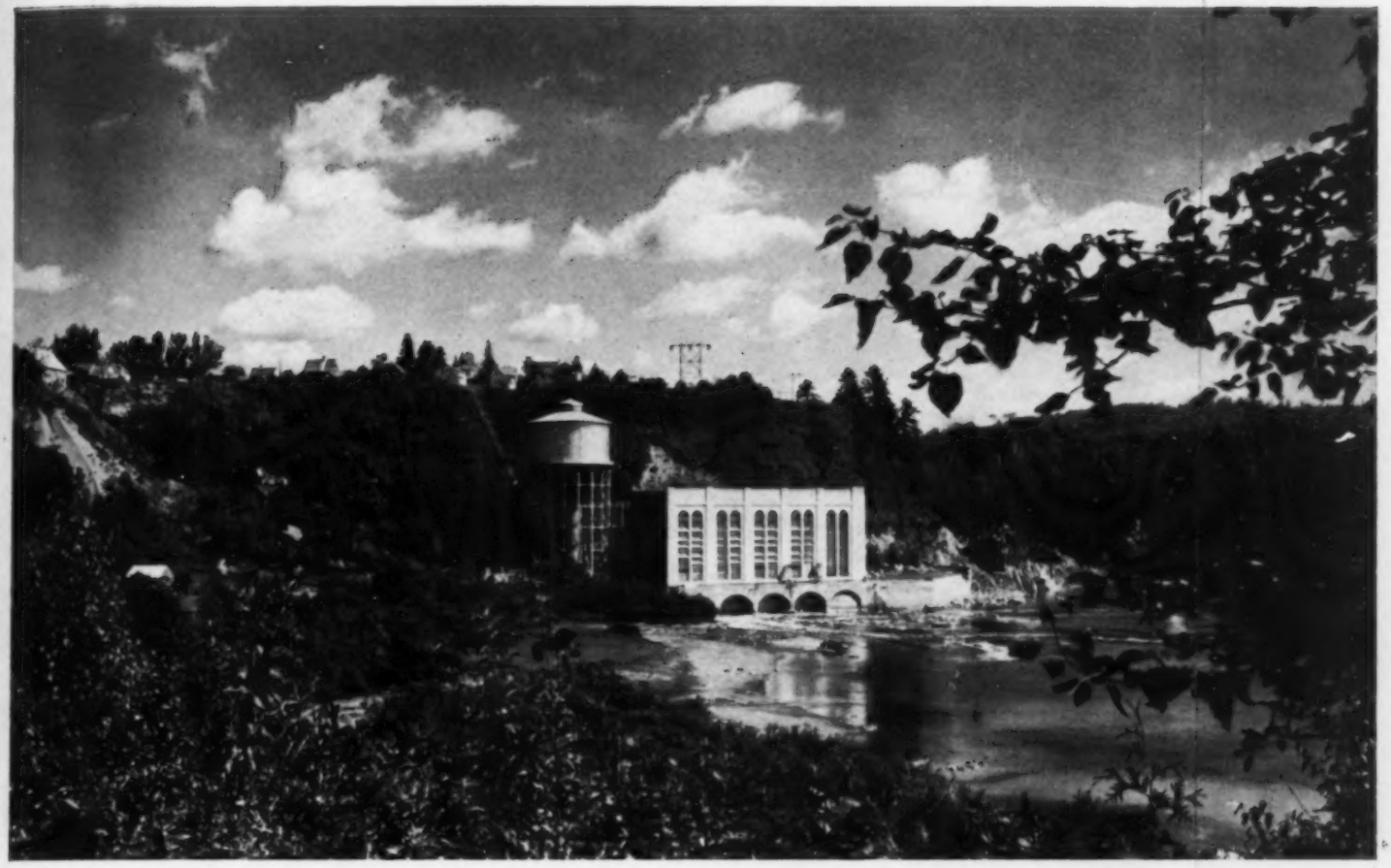
The Tobique lies wholly within the province and has its origin in a network of lakes and streams deep in the hilly forests of central New Brunswick. Winding through a rich alluvial valley the Tobique pours its translucent waters into the St. John River a few miles above the village of Perth.

The site chosen for the dam and power house of the 27,000 h.p. development is known as The Narrows. Here, before the dam was built, the river rushed through a narrow rocky gorge for a distance of almost a mile. Now, however, thousands of tons of reinforced concrete reaching a height of over 80 feet have transformed this gorge into a placid lake reaching eleven miles upstream.

Each large project appears to present engineers with at least one special problem. At Musquash it was a diversion of a branch of the river; at Tobique it was the construction of a fishway so that the far-famed Tobique salmon



Waiting for high tide to lay the submarine cable from the mainland to Shippegan Island off the east coast of New Brunswick.



Power house and surge tank of the Gatineau Power Company's 80,000 h.p. hydro plant at Grand Falls on the St. John River.

could overcome the eighty-foot obstacle and continue from the Atlantic to their spawning grounds in the upper reaches of the river, a journey of some 240 miles.

In his book *The Saint John River*, published in 1893, J. W. Baily has this to say about the Tobique trout and salmon: "A gentleman when visiting the river in 1863 said the trout are so numerous and voracious as to jump at the canoe paddles; while in 1842 a settler living near the mouth of the river killed twelve barrels of salmon with a single spear."

Wise conservation regulations have long since outlawed this massacre and established a catch limit. Ardent fly fishermen from all parts of Canada and the United States journey annually to their camps and fishing clubs along the Tobique to battle with this king of sporting fish. For years, guiding, outfitting and catering to these visitors have formed an integral part of the economy of the area. Anglers and outfitters were therefore anxious as to the effect of damming the river.

Engineers, confronted with the problem of saving this natural heritage, employed the knowledge and experience of leading authorities in Canada, the United States, and the United Kingdom. The result of their exhaustive study was a design for one of the highest and most modern fishways in Canada. Whatever scepticism may have existed among the anglers was dispelled when the early June run of Atlantic salmon leisurely finned its way up and around the eighty-foot dam.

The channel of the fishway is eight feet wide and constructed to require the minimum effort on the part of the fish. Staggered every six feet along the channel are partitions which create sixty-eight riser pools. As the channel

A pulp and paper mill at Lancaster. Recent plant extension included a 10,000 h.p. steam generating unit. In the foreground are the Reversing Falls.

Surrounded by thousands of square miles of heavily wooded forests this earth filled dam on Trousers Lake is capable of storing 36,600 acre feet of water for the hydro plant on the Tobique River.

Looking up the gorge of the Tobique River bank is the beginning of a coffer dam; this $10,500,000

ascends there are four large pools where the fish can rest. At the head pond the salmon enter a partially submerged trap where they are counted and released by inspectors of the federal Department of Fisheries. By mid-summer of 1953 thousands of salmon had completed the eighty-foot climb to the head pond, testifying to the complete success of this important phase of the Tobique power project.

During the year 1953 the largest annual increase in generating capacity went on the transmission lines of the New Brunswick Electric Power Commission. The new 27,000 h.p. hydro-electric development on the Tobique River and a 20,000 h.p. unit at the Grand Lake

In the immediate foreground is one of the four resting pools in the fishway of the New Brunswick Electric Power Commission's Tobique River hydro development.

This fisherman and his guide appear to have no worries Well over 2,000 salmon were taken from the Tobique Riv Thousands more navigated the fishway

in the fall of 1950. The crib work on the right was the first step in the construction of the hydro development.

The dam and power house at Tobique Narrows. A highway bridge crosses the top of the dam. Shortly below the dam the Tobique flows into the St. John River. The 27,000 h.p. project began operation in April 1953.

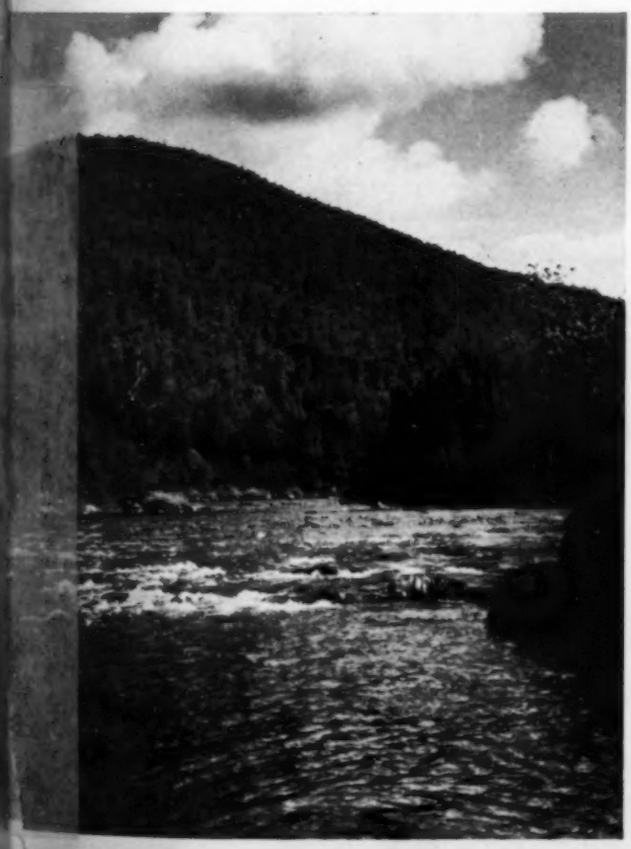
steam plant have extended the commission's installed capacity to 151,000 h.p. Considering its present maximum peak load, the provincial utility now has a surplus of approximately 35,000 h.p.

History has shown, however, that regardless of the amount of power generated by new and greater developments, the surplus has been quickly absorbed and put into economical use.

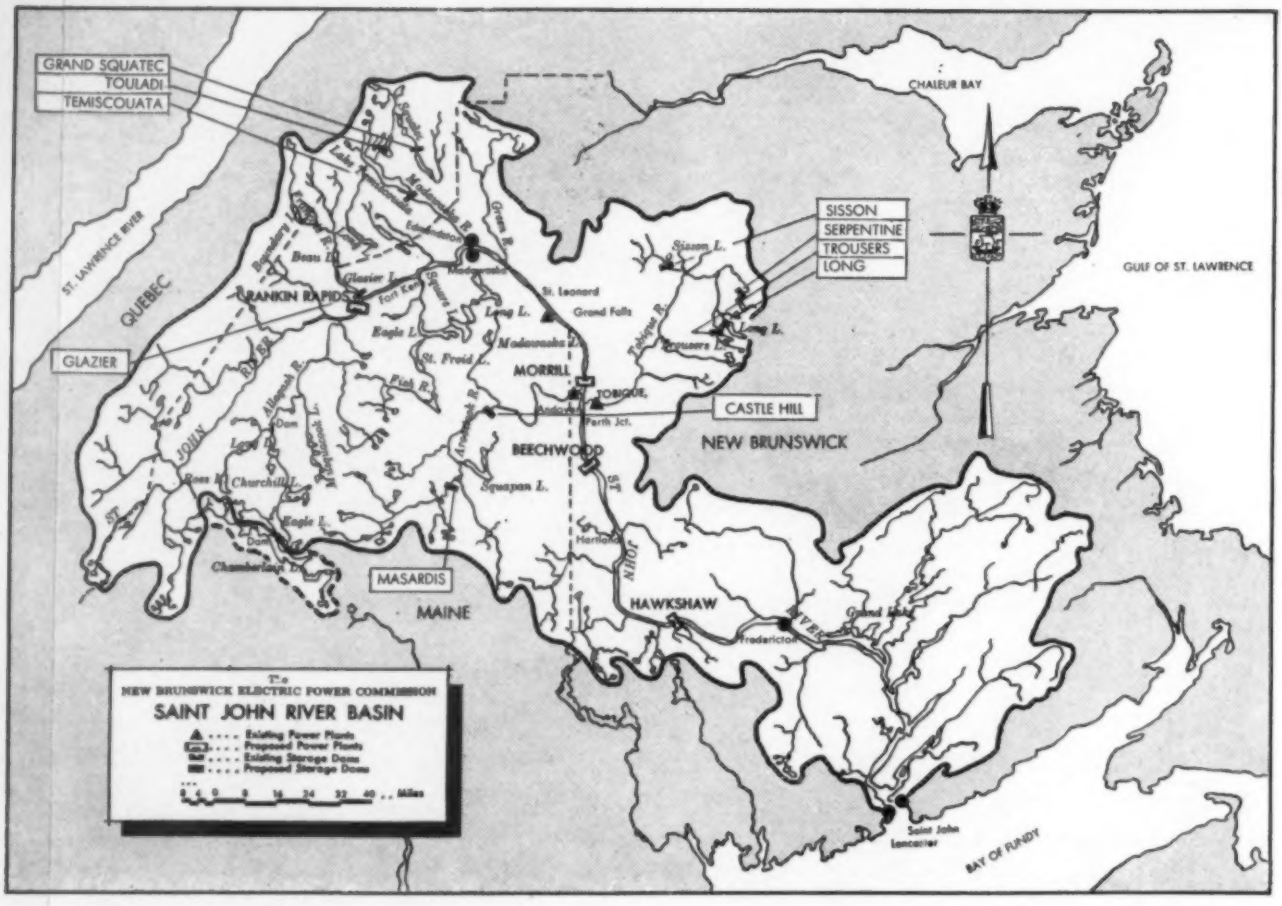
Future Development

The commission's planning for future power needs is based on the engineering tenet that the most economical generating system for the province is an integrated and interconnected system of hydro and thermal generation. (Prior to the Tobique installation a relatively

about hydro development spoiling their favourite sport.
er and its tributaries by anglers during the 1953 season.
of the 80-foot dam near the mouth of the river.



Miles away from the cares and worries of a business world this lone fisherman is pitting his skill against the wily silver salmon on the Serpentine, a tributary of the Tobique River.



small proportion of New Brunswick electric energy was derived from water, the greater part being generated by steam and diesel plants.) It was with this in mind that several rivers have been investigated as potential power producers. The largest and most significant is, of course, the St. John River. It is 450 miles long with a drainage area of 21,350 square miles.

The complexities of the St. John River system involve boundary problems which necessitate international and interprovincial agreement and co-operation. Through the efforts of the New Brunswick Resources and Development Board, the Canadian Department of External Affairs was able, in 1950, to interest the International Joint Commission in having a study made of all potential power sites on the river.

The basin of the St. John River drains 11,250 square miles in the Province of New Brunswick, 2,750 square miles in the Province of Quebec, and 7,600 square miles in the northern section of the State of Maine. Two committees were set up in connection with the study, a four-member engineering board and an engineering work group, the latter composed of members of utilities from New Brunswick, Quebec, and Maine and representatives from large industries and conservation bodies.

The work group studied ten potential power sites and a number of storage sites in the river basin. In the summer of 1953 an interim report

Site of the New Brunswick Electric Power Commission's proposed 135,000 h.p. hydro development at Beechwood. The 60-foot head created by the dam will necessitate moving the railway shown on the right bank of the river.

For their knowledge and generous assistance in the preparation of this brief history, the writer is very grateful to Dr. H. J. Rowley, Chairman, N.B. Resources Development Board; Mr. R. E. Tweeddale, Chief, Development Division, N.B. Electric Power Commission; and Mr. E. L. Brown, Engineer, N.B. Electric Power Commission.

was submitted to the International Joint Commission. This report confirmed the earlier investigations made by the provincial Resources Development Board. It is estimated that the river could economically produce approximately 800,000 h.p. First site in development of the river would probably be at Beechwood, with subsequent developments at Morrill and Hawkshaw.

In addition to the St. John River, greatest potential source of hydro power, the Resources Development Board and the provincial commission has collected data on other river sites in the province. The Shogomoc River, where a head of 350 feet is available could develop 8,000 h.p. The Tetagouche could utilize a 400-foot drop to develop some 15,000 h.p. and the Magaguadavic could produce an additional 16,000 h.p. Other rivers being studied by commission engineers are the Lepreau, Pokiok, and Nepisiquit which, when necessary, could add a further 130,000 h.p. for a total hydro-electric potential of almost 1,000,000 h.p.

No account of New Brunswick electric power potentialities would be complete without some mention of the possible use of tidal power. A preliminary survey was made in 1950 at Passamaquoddy Bay at the entrance to the Bay of Fundy under the direction of the International Joint Commission. At that time it was estimated that a full scale survey to determine fully the economic feasibility of the project would cost nearly four million dollars. The Canadian Government has indicated that, for the time being at least, it is not interested in participating in the survey.

There are two other possible sites for harnessing the tides of Fundy, both located at the head of the bay where the tidal range varies between forty and fifty feet. One is at the confluence of the bay and the Memramcook and Petitcodiac rivers. Investigations carried out there in 1944 and 1945 have shown the site to be uneconomic.

The second and much larger plan known as the Melanson Proposal envisages a dam across the head of the bay enclosing both the Chignecto and Cumberland Basins. Although no on-the-site engineering investigation has been conducted to determine its feasibility, the site is presumed by the author of the report to be capable of generating some 2,000,000 h.p.

New Brunswick is keenly aware of the necessity for adequate electric power at reasonable cost and is resolved that never again will shortage of such power prove detrimental to the prosperity or welfare of its citizens.

The Labrador peninsula (parts of Northern Quebec and Newfoundland). The broken lines show journeys made by A. P. Low in this region between 1885 and 1899.

Albert Peter Low

by F. J. ALCOCK

National Museum of Canada photographs.

THE DISCOVERY of immense deposits of iron ore in the heart of the great peninsula lying between Hudson Bay on the west and the Gulf of St. Lawrence and the Atlantic Ocean on the east and their recent development have drawn attention again to the explorer whose name is inseparably connected with this region. The traverses of Albert Peter Low by canoe, dog-team, and on foot in various directions across it and his work by boat along its coasts furnished the first real information concerning much of it. The region politically belongs to two provinces of Canada, the eastern coastal portion, Labrador proper, to Newfoundland and the remaining much larger part to Quebec. To Low the whole was the Labrador peninsula,

over half a million square miles in extent, at the time he began work the largest unexplored area in Canada.

Low was born in Montreal on 24th May, 1861, and in 1882 graduated with honours in Applied Science from McGill University in that city. Shortly afterwards, on July 1st, he joined the staff of the Geological Survey under Alfred R. C. Selwyn. His first independent assignment was in Gaspé Peninsula in 1883 where he had served during the two preceding field seasons as an assistant to R. W. Ells. His principal traverse in this connection was up the Ste. Anne River from the St. Lawrence, through the Shickshock Mountains to Lake Ste. Anne, across a low divide to one of the headwater branches of the Little Cascapedia River and down that stream to Chaleur Bay. In 1923, while working in central Gaspé, the writer found near Lake Ste. Anne what he believed to be a souvenir of that traverse. This was a rusted Geological Survey of Canada micrometer disk that had apparently been lost by Low forty years earlier.

The next two years saw the first of Low's Labrador investigations. Starting from the St. Lawrence in 1884 he ascended the Bersimis or Betsiamites River and the upper part of the Peribonca. Leaving the canoes on the latter stream the party started on foot for the Hudson's Bay Company post on Lake Mistassini on November 27th dragging their outfit on toboggans. They arrived on December 23rd, the last ten days part of the long and difficult tramp on snowshoes having been made on very short rations and with the thermometer ranging to forty degrees below zero.

An incident in connection with this project illustrates the character and hardihood of Low. The work was being done in conjunction with a provincial party. During the winter certain disagreements arose regarding how the work should be continued. In order to establish who was really in charge Low on February 2nd started for Ottawa which he reached on March 2nd. Three weeks later he received his instructions and with a letter stating that he was in full charge of the work he started back rejoining the others at Mistassini on April 29th. In the field season that followed Lake Mistassini, which has a length of over one hundred miles, was surveyed and later in the summer the Rupert River was descended to James Bay.

For the next six years Low was engaged in a variety of exploratory and geological work in other fields. In 1886 he traversed a belt of country between Lake Winnipeg and Hudson Bay by ascending the Berens River from the former, crossing the divide, and descending the Severn River to the Bay returning by the old York Boat route from York Factory up the Hayes River to Nelson House at the head of Lake Winnipeg. In 1887 he descended the Missinaibi River of northern Ontario to map the islands of James Bay. Then for several years he carried out geological mapping chiefly in Portneuf and Montmorency counties northwest of the St. Lawrence.

In 1892 Low returned to the Labrador peninsula and the explorations he carried out from then until 1899 are the ones for which he is best known. Starting from Lake St. John he crossed to Lake Mistassini and thence by the upper Rupert waters to the Eastmain and down the latter to James Bay. In the following year he

A. P. Low

A large bark canoe on the northwest side of Lake Mistassini, Quebec.

once more started at Lake St. John and proceeded again by the same route to the Eastmain. This time he ascended that stream. Crossing the divide to waters flowing north he descended the Kaniapiskau and Koksoak Rivers to Fort Chimo at the foot of Ungava Bay. He had planned to pass the winter there but learned that during the previous winter the herds of barren ground caribou upon which the Indians and Eskimos of the region depended almost wholly for their food and clothing had failed to make their usual migration southward to the region and that as a result upward of one hundred and fifty persons had died of starvation. He therefore took passage on the Hudson's Bay Company's steamship *Erik* to Rigolet on Hamilton Inlet on the east coast.

The work of the 1894 season began in March, the party of six proceeding up the Hamilton on snowshoes hauling on toboggans their outfit and supplies sufficient to last them for five months. This necessitated at least three loads and often four for everyone so that the same ground was passed over five or seven times. On May 20th when they had reached a point near Grand Falls they were halted by the break-up of winter and from there on travel was continued by canoe. The summer was spent mapping a number of streams and lakes in the headwater region of the Hamilton. One of these lakes was Michikamau upwards of seventy miles long and at one place twenty-five miles wide, the largest body of water, after Mistassini, in the whole peninsula. In the autumn the party descended the Romaine and St. John Rivers to the mouth of the latter stream near Mingan on the Gulf of St. Lawrence. In these two years' work Low travelled 5,460 miles: by canoe 2,960 miles, on vessel along the coast 1,000 miles, with dog teams 500 miles and on foot 1,000 miles. It was during these two years also that he outlined a belt of stratified rocks extending in a north-northwest direction from the upper part of the Hamilton waters across to the Koksoak. Low reported that these rocks contain a quantity of valuable iron ore so great that, in the exposures seen by him, it was estimated in millions of tons.

In 1885 Low ascended the Manicougan River which flows south joining the St. Lawrence about 220 miles below Quebec City. The river was followed for 200 miles and then in order to reach Summit Lake, the source of the stream, a parallel route 125 miles long, marked by many long portages was followed. From there another route was followed westward to Lake Nichicun to tie up with the 1893 traverse. The route followed in returning was down the Manicougan including the portion that had been by-passed in the ascent. This included a narrow gorge fifty miles long where it was impossible to make portages and where rapids were continuous. In a particularly dangerous part a canoe was upset and one of the Indian canoemen was drowned.

In 1896 starting from Missanabie on the Canadian Pacific Railway Low descended the Moose river to James Bay. A government fishing boat was fitted up and in it the party sailed 450 miles along the east coast of Hudson Bay to Richmond Gulf. Leaving their boat Low and his party proceeded inland by canoe, crossed the height of land to northeastward-flowing waters and descended the Stillwater and Larch rivers to the Koksoak and on to Fort Chimo. Here a passage was taken on the *Erik* to Rigolet on Hamilton Inlet where a transfer was made to a schooner bound for Quebec. Ottawa was reached on October 10th.

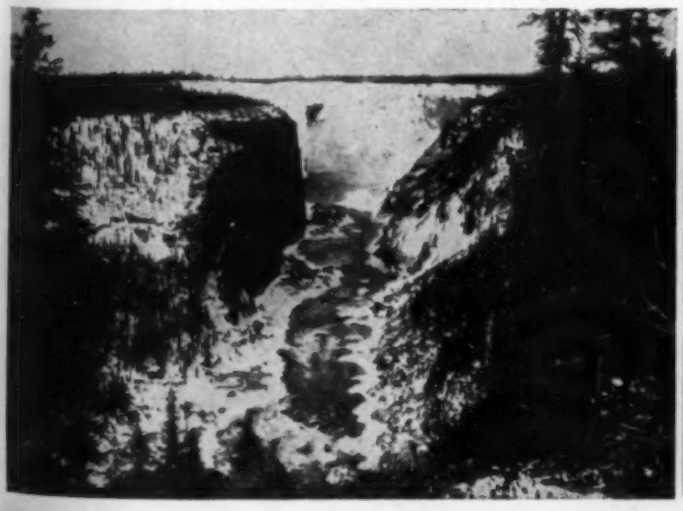
In 1897 the northern coast of the peninsula along Ungava Bay and the south side of Hudson Strait was explored and mapped by boat and in the following year a similar examination was made of the east coast of Hudson Bay from Cape Wolstenholme south to Great Whale River where he remained the following winter. Early in February, 1899, preparations

began for a renewal of work. Two exploration surveys were made on foot one eastward into the barren interior and the other up the Great Whale River. In the following spring the examination of the east coast of Hudson Bay was continued and the work carried south to the foot of James Bay. An important phase of the work was the investigation of the iron-bearing beds of the Nastapoka islands.

Though perhaps best noted for his Labrador traverses, Low's name is also an important one in connection with Arctic exploration. In 1903 he was appointed to the command of the "Government Expedition to Hudson Bay and Northward". The ship chosen was the *Neptune*, the largest and most powerful of the Newfoundland sealing fleet. It had a register of 465 tons and a cargo capacity of 800 tons. Its wooden sides where a contact with ice was expected were nearly eighteen inches thick and its bow was reinforced with iron plates. With a total company of forty-three, the *Neptune* left Halifax on August 22, passed along the Labrador coast, making certain stops to study the geology, and then on to Cumberland Gulf on the east side of Baffin Island. Returning south to Hudson Strait an examination was made of parts of the coast and of certain islands, particularly Southampton at the northwest corner of Hudson Bay, and then Fullerton Inlet on the mainland west of Southampton Island was chosen as the site for winter quarters. The ship was roofed in and banked all round with snow, making it dry and comfortable. In the months of April and May traverses on foot were made to explore the adjacent region. It was July, however, before the *Neptune* could sail north. It passed through Hudson Strait and up along the east side of Ellesmere Island. Turning south the expedition entered Lancaster Sound studying the south shore of Devon Island and landing at Beachey Island where Sir John Franklin with the crews of the *Erebus* and *Terror* passed his last winter in harbour. The return journey was down Baffin Bay and through Hudson Strait again to Fullerton and thence back to Halifax which was reached on October 12th after a voyage which had lasted fourteen months. During it the *Neptune* had steamed 10,000 miles, 9,100 in open water and 900 through heavy ice. The voyage had accomplished many things. Over 1,100 miles of previously unsurveyed coast had been charted, numerous astronomical observations and soundings made, a large amount of rock specimens and fossils collected, studies and photographs taken of the Eskimos, and collections of northern birds, mammals, fish, etc. brought back. In a very interesting volume *The Voyage of the Neptune* Low has furnished details regarding the expedition.

In 1906 Low became Director of the Geological Survey and in the following year when a new Government department, that of Mines, was organized to include the Geological Survey and another division that became known as the Mines Branch, Low became its first Deputy Minister. He occupied that position until 1913, when, due to a very severe sickness which incapacitated him, he took his superannuation. He died at his home in Ottawa on 9th October, 1952.

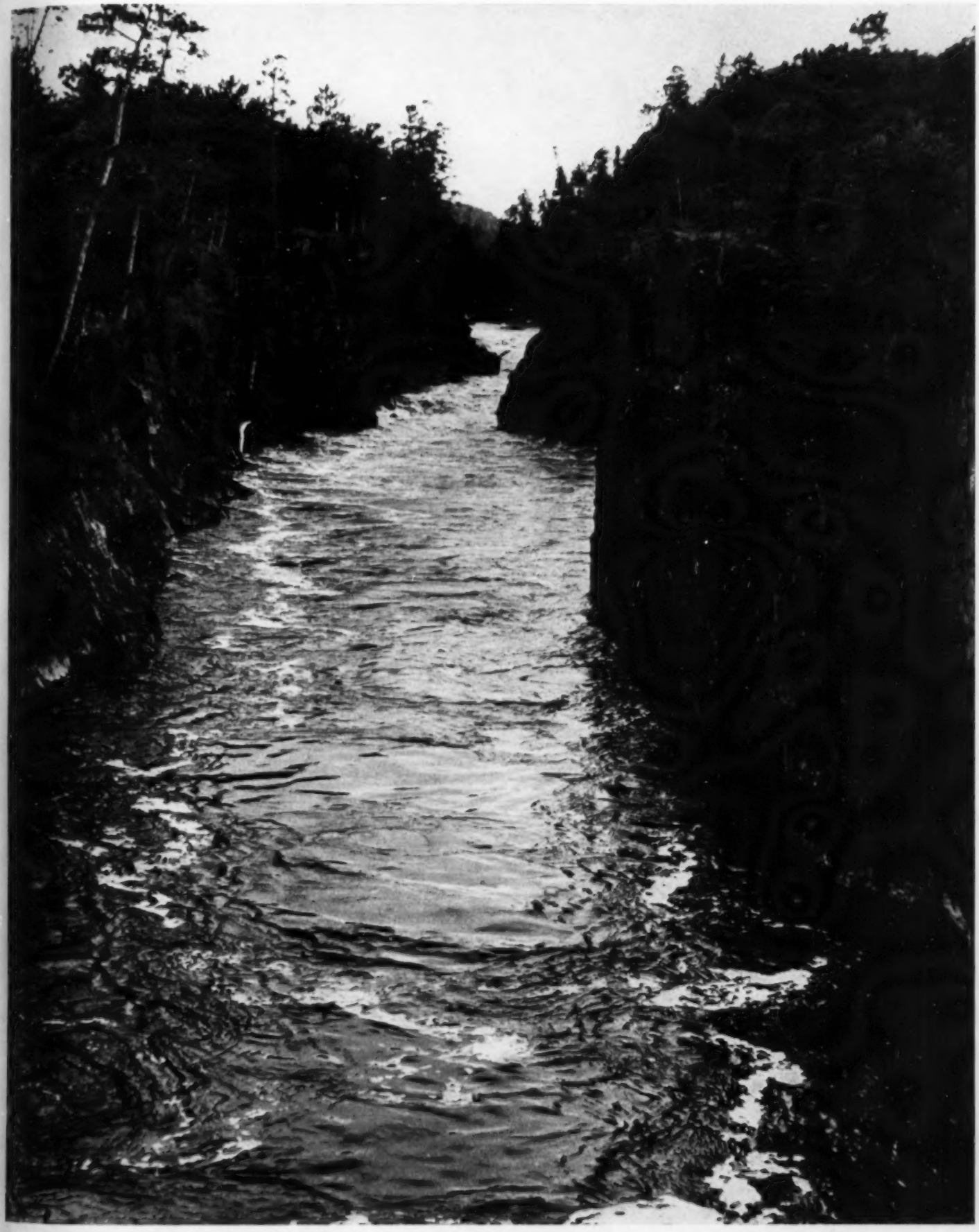
Bowdoin Canyon below Grand Falls on the Hamilton River. The canyon is 12 miles long and ranges from 350 to 900 feet deep.



Rapids on Larch River, a tributary of the Koksoak which flows into Ungava Bay.

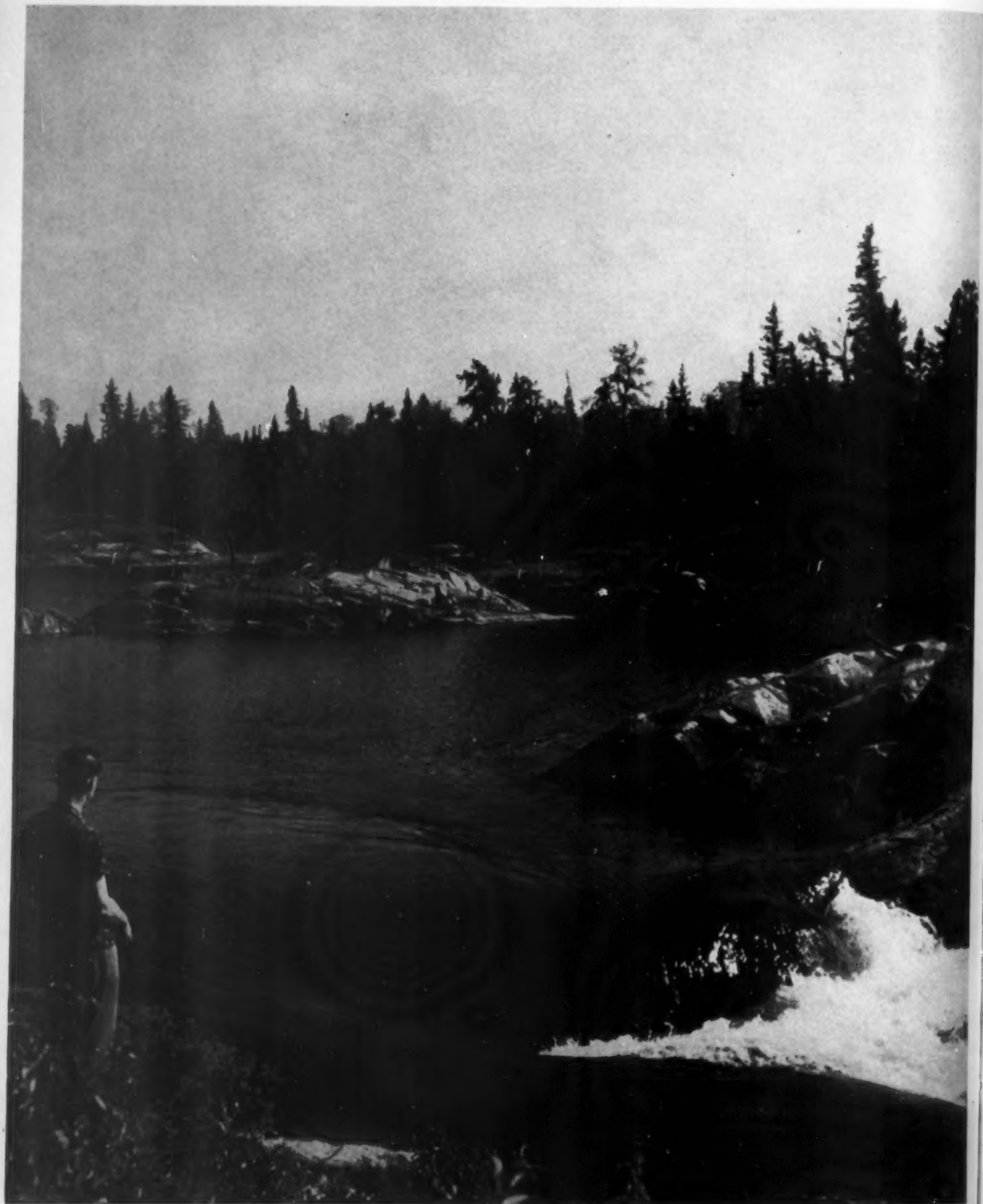
The quiet rural charm of Prince Edward Island is typified by this view of the village of New Glasgow. Silver birches frame church and school-house; the trim houses nestle close to the rolling, fertile fields of the farm on the hill; cattle pasture by the stream that babbles past the friendly village. To stay here is to dwell for a while in a world removed from the bustling exhaustion of modern industry and mechanization.

National Film Board



Pictures of the Provinces — II

The canyon known as "Tunnel" on the Mississagi River in the Algoma district of Ontario, north of Lake Huron, sparsely settled region of forests and rocks, lakes and rivers. Richard Harrington



Southeastern Manitoba is rugged and beautiful. The Winnipeg River, actually a chain of small lakes that winds into the wilderness of that sector of the province, has an abundance of game fish, birds, and animals, as well as inspiring scenery. Hunting and fishing lodges provide a haven for sportsmen. This wilderness area is reached by plane or by boat from Lac du Bonnet, which is about seventy-five miles northeast of the city of Winnipeg.

Manitoba Travel and Publicity Bureau

EDITOR'S NOTE-BOOK

Lyn and Richard Harrington (*Eastern Rockies Forest Conservation Project*) are well known to our readers as author and photographer. They have covered the length and breadth of Canada and continue to travel in quest of interesting features. Richard Harrington's latest book of collected photographs is *Northern Exposures*, published last fall.—Phil Shackleton (*School for Survival*) made a special trip to study the methods and take photographs at the R.C.A.F. Survival Training School in Alberta where flyers are taught how to look after themselves if they happen to leave the air for the ground in the far north.—Walter A. Dixon (*Electrifying New Brunswick*) is on the staff of the New Brunswick Electric Power Commission and closely concerned with the progress of electrification in that province.—Dr. F. J. Alcock (*Albert Peter Low*) was for more than thirty years with the Geological Survey of Canada before being appointed, in 1947, to his present position as Chief Curator of the National Museum of Canada.

* * *

British Empire and Commonwealth Games

From July 30th to August 7th this year Vancouver will be host to visitors from many parts of the world, gathered for a single purpose, "The Games". The opening ceremonies will take place at Empire Stadium, a track and field amphitheatre with seating capacity of 25,000, which is now being completed. This is not the only construction under way in connection with the Games, for there will be a brand-new Olympic standard swimming pool, and a 250 metre cycle track.

The Games have not been held in Canada since 1930, when they took place at Hamilton, Ontario. That occasion was so successful that it was decided that similar Games should be held every four years, and a British Empire Games Federation should be formed. This was not constituted until two years later, following the Olympic Games. The first Empire Games, however, took place in 1911, in connection with the coronation of King George V, when an inter-empire sports meeting was held in London, with participation by Canada, Australia, South Africa, and Britain. Since the Hamilton meeting, the four-yearly games—suspended during the war—have been held in London, in Australia, and in New Zealand.

Canadians are pleased that 23 of the 26 nations affiliated with the British Empire Games Federation have already entered the Games for 1954, and that the Sovereign will be represented by H.R.H. the Duke of Edinburgh who will spend several days in Vancouver attending the various events. Some 700 athletes are expected to compete, many of whom will not have been in Canada before. Most of them will be housed at a camp at the University of British Columbia. The entrants must all be British subjects and none may compete for one country at one meeting and subsequently for another country, nor may anyone who has ever been classified as a professional in any sport compete.

The competitions will include track and field, swimming, cycling, boxing, weight-lifting, wrestling, lawn bowling, fencing, and rowing events.

Vancouver is expecting a large number of spectators to view the games and preparations are being made to ensure that there will be ample accommodation and all necessary facilities to care for the visitors.

* * *

AMONGST THE NEW BOOKS

On the Edge of the Primeval Forest

by Albert Schweitzer

(Macmillan, Toronto, $1.00)

The popular English edition of this book marks the fortieth anniversary of the author's establishment of his hospital in French Equatorial Africa. The original book went through twelve reprintings since it was first published in English, and to judge by its contents, it will go through a great many more. The simple directness of purpose arouses deep reverence for the young professor who sacrificed an excellent career in the University of Strasbourg in order to go and toil among very primitive natives in one of the worst climates possible where the sun is a dangerous enemy from the first beam at sunrise to the last ray at sunset. Here with a whitewashed fowl-house as hospital and a native boy who could neither read nor write (a fact which in no way detracted from his competence as a surgical assistant) Dr. Schweitzer and his wife braved the malaria, the tsetse flies, the termites, the infections against which they had no means of protection, and the inherent dishonesty of the natives. They won out in their initial battle to bring help and healing in a land of which an old chieftain said "Our country devours its own children".

Eventually a small iron hospital building was constructed at the Paris evangelical mission station at Lambarene, a considerable town just south of the equator on the Ogowe river not far from the Atlantic coast. The climate on the coastal plain makes it impossible to grow any cereal, rice, or potatoes and there is no pasture for cattle. The river, which at first was the chief means of transport, was swarming with hippopotami who often attacked the shallow boats or rafts bringing urgently needed hospital supplies. Albert Schweitzer neither ignored nor complained of his difficulties, but faced them squarely, with a clear eyed faith which seemed beyond the common mortal touch, till one by one he brought his problems within manageable compass. Surely no man was ever better fitted for the task he had taken in hand, and he constantly insists upon the fact that anyone working on a mission station must be able and ready to turn his hand to any job whatsoever. His own versatility included the gift of music and he records whimsically how he made the great Johann Sebastian Bach help support the hospital, for Schweitzer devoted all the royalties he received from his books on Bach as well as fees for organ recitals, to the support of his hospital which has now brought untold blessings to countless thousands.

S. SEELEY

Wildlife in Alaska

by A. Starker Leopold and F. Fraser Darling

Sponsored by The New York Zoological Society and The Conservation Foundation

(Ronald Press Co., New York, $2.75)

Alaska is a vast northern land wherein important natural resources show some extraordinary local concentrations but a low average per unit of area. It is capable of much useful development, the greater part of which has yet to take place, and if its resources are properly utilized it can maintain a substantial population. The optimum development of the territory must, however, be realistically based upon local resources and conditions and be skilfully adjusted to them. Attempts to force development into a replica of that which has succeeded in more southern regions, with very different resources and conditions, will be harmful and will invite loss and failure. Alaska's scenery, remoteness and wildlife can, if wisely managed, be her chief continuing resource. Despite great changes, some of them regrettable, in Alaska in the past sixty years, the degree of development of the territory is in general so low that there is presented a rare opportunity "to predetermine the course of development and utilization of wildlife resources in an area that is still not far removed from original condition".

This is the thesis of the distinguished authors of this compact little volume. Excellent judgment was shown by the sponsors in selecting these eminent wildlife scientists, Dr. Leopold from the University of California and Dr. Darling from the University of Edinburgh, to investigate together the wildlife of Alaska, its environment and its management. Their illustrated report, clear, well reasoned and concise, constitutes the work under review. Caribou, reindeer and moose are held to be the most important animal resources of Alaska and a chapter is devoted to each. Emphasis is laid on an ecological approach to their management and treatment of the supporting ranges is considered of prime importance.

North of the Arctic Circle, where the range is relatively undamaged, caribou appear to be as abundant as they have ever been. South of the Circle, caribou have suffered a great and rapid decrease in numbers and now occur in ten small, scattered herds. It is believed that this decrease has been caused chiefly by range deterioration, which is attributed to reindeer grazing and to fire. A basic step in improvement in the situation must be extensive scientific research.

The rise and fall of reindeer in Alaska are outlined and the underlying factors are sought. Attention is given to careless herding, predation by wolves, and excessive slaughtering, to one or more of which the rapid decline of Alaskan reindeer in the past twenty years is commonly attributed. It is recognized that an Alaskan reindeer industry involves Eskimos as well as reindeer and that psychological and social problems are of high importance. Yet "the overwhelming cause of the collapse of

the reindeer population" is, in the authors' opinion, deterioration of the winter range. They believe that the outlook for reindeer grazing as a major Alaskan industry is dim, but that reindeer husbandry can help to provide protein for the Eskimo, which was the original intention.

Because of increase in browse preferred by moose and of effective protection of this species by law in some areas, the moose stocks of Alaska are increasing. Here and there harmful overpopulation already exists. In the vicinity of Indian villages along the Yukon, on the other hand, overhunting still causes scarcity of moose. Present management measures are inadequately adjusted to such local differences in moose conditions. Much more research is needed.

Management of black-tailed deer, Dall sheep, mountain goat, muskox, bison and elk is also discussed.

The authors make a strong plea for a broad approach to wildlife management. There is said to be need for improved organization and co-ordination of the government agencies concerned, a basic management policy that will give greater heed to the fact that good range is essential, and improved public relations. The needs and legitimate interests of the native peoples of the territory should receive generous consideration in any wildlife conservation program.

So many of Alaska's conditions and wildlife management problems are shared by Canada's northern territories that this book must be of special interest to all who have to do in any way with Canadian wildlife north of 60°. Advances in wildlife research and management that the appropriate authorities have, in recent years, put into effect in the Northwest Territories through the Canadian Wildlife Service and the local administration are paralleled, in a number of instances, by the recommendations that our authors make for Alaska.

HARRISON F. LEWIS.

* * *

I Live in the Woods

by Paul Provencher

(Brunswick Press, Fredericton, $4.00)

When Paul Provencher selected the title "I Live in the Woods", he was telling the literal truth for, in his position as chief forester for two large paper companies on the north shore of the St. Lawrence, he does of necessity live in the woods a good deal of the time. His knowledge of woodcraft, therefore, is that of the professional, not that of the amateur or hobbyist, or even of the dedicated "boys' camp" leader. Here he presents the day by day utilitarian information and advice that means safety and comfort in the woods.

In 1943, Paul Provencher was selected as instructor in the Canadian Army School of Bush Fighting and, from what he told me about it, this was "quite an experience", not only for his pupils but for him too. The Army sent him a group of husky young commandos averaging something over six feet tall, and they didn't fit neatly in canoes.

Fortunately, the author is not only a good woodsman, he is also articulate, an able lecturer, photographer, and artist. A graduate of Laval University, he has the knack of presenting his material in a clear and logical way. His sketches are adequate and, while they hardly pretend to be great art, you can easily see what he is driving at, and that's what is needed. He has not felt it necessary to make them "funny". The photographs, as is so often the case in this kind of book, are less instructive than the line drawings.

There are useful chapters on maps and finding one's way in the woods, travelling in summer and winter, clothing, building shelters, and various ways of finding something to eat and cooking it. If any fault is to be found, it is that some of the directions are so condensed as to be a little difficult to follow. The author knows the subject so well that he tends at times to run away from his readers.

One of Paul Provencher's recent delights is the discovery of the joys of archery, and he now has I don't know how many bears to his credit. When he shot the first one, he was so incredulous that he got a sworn statement from a local J.P. so that he could convince himself that he really did it.

For those interested in woodcraft, this is one of the first books to acquire, remembering always that it has special reference to eastern Canada and not to British Columbia or the North or the Rockies. DOUGLAS LEECHMAN

The Seagram Collection of Paintings of Canadian Cities builds world-wide goodwill for Canada

Over a year ago, a unique collection of 52 paintings of 22 Canadian cities took to the air for an unprecedented 30,000-mile international goodwill tour.

Painted especially for The House of Seagram by Canada's distinguished artists, these original canvases were on an unusual mission—to stimulate a deeper interest in things Canadian, and to earn increased friendliness and broader understanding for Canada by showing the peoples of other lands the impressive aspect of our urban centres from coast to coast.

First stop on the year-long international itinerary was San Juan, Puerto Rico. Then came Havana, Cuba; Mexico City, Mexico; Caracas, Venezuela; Rio de Janeiro and Sao Paulo, Brazil; Buenos Aires, Argentina; Montevideo, Uruguay. Then, from Latin America, on to Rome, Italy; London, England; Paris, France; Geneva, Switzerland; Stockholm, Sweden; The Hague, Netherlands; Madrid, Spain; and a visit to the Canadian Armed Forces in Soest, West Germany.

Across two continents they flew, these fifty-two colourful Canadian ambassadors of goodwill, touching down in fifteen different countries where they were exhibited at

Route of the International Tour of the Seagram Collection of Paintings